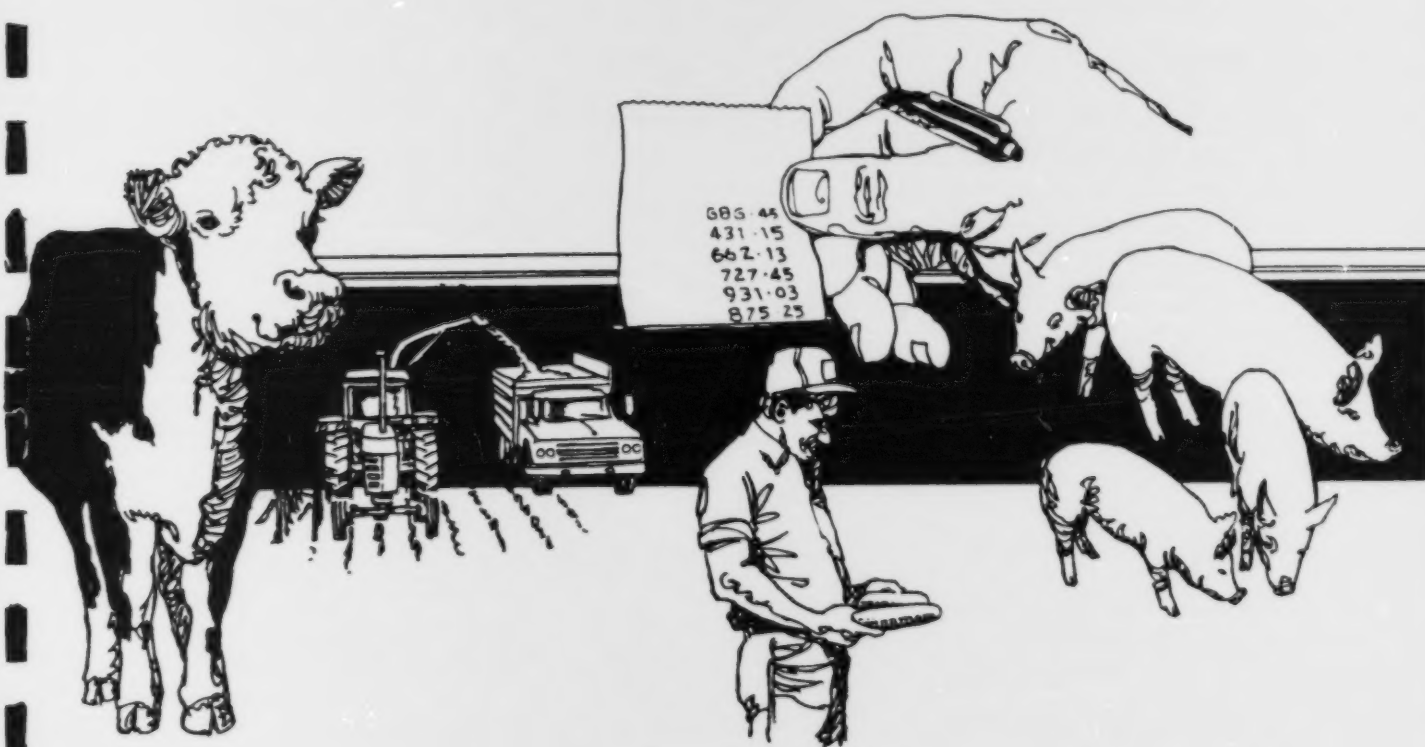


Soils and Crops

Project Results

1989



Soil & Crop Improvement Associations

A C K N O W L E D G E M E N T S

The technical support of Charles Surette and Alden Knight and the efforts of Summer Assistants Allan Stewart, Tammie Stewart, Jean Baillie, Chris Dunbar, Kim Barteaux, Stephanie Bishop, Chuck Dentelbeck, and Curry Keoughan.

The contribution of the following companies to various projects are acknowledged:

BASF	Minas Seed Co-op
Bishop Seeds	Rhone Poulenc
Chemagro Ltd.	W.A. Flemming
Ciba Geigy	Pioneer
Co-op Atlantic	Niagara Chemicals
Fermente Inc.	Uniroyal Chemical
Sandoz	Thompson Seeds
Chipman	

INDEX

FORAGES

Pasture Mixture Study	1
Pasture Mixtures	5
Maritime Regional Ryegrass Trial 1989	7
Sorghum - (Sudangrass)	8
Hardwoodlands Forage Demonstration and Test Site. Est. 1986 ...	9
Perennial Ryegrass Screening Trial	10
Haylage Mixtures	11
Forage Establishment Trial, Lunenburg Soil & Crop	13
Seed Treatment and Its Effect on Forage Establishment, Annapolis County Soil & Crop	17
Forage Cutting Date Study	19
Forage Quality Monitoring Project	25
Forage Establishment Demonstration	28
Pasture Mix Preference and Persistence Demonstration	31
Pictou Co. SCIA Forage Demonstration Site	33
White Clover Frost Seeding Project	37
White Clover Demonstrations	39
New and Improved Perennial Pasture Mixtures Demonstrations, ALFI Project # TT109	40
Evaluation of an Intensive Pasture Management Program for Native Pasture Species, ALFI Project # TT120	43
Verticillium Wilt Resistant Alfalfa Cultivar Adaptability Trial	46
ALFI Evaluation of a Vredo No-Till Forage Seeder	47

CEREALS

Winter Wheat Date of Seeding in Cape Breton	50
Winter Wheat (On-Farm) Variety Trial	52
Winter Wheat Production Management Trial	53
Fusarium Control on Cereals	56
Spring Cereal Seed Treatment Evaluation	57
Spring Wheat Production Management Trial	59
Spring Cereal Broadcast vs. Drill Demonstration	61
Barley Production Management Trials	63
Disease Control on Spring Wheat, ALFI Project # TD 32	70
Foliar Fungicides on Spring Wheat and Barley	72
Max/Katepwa Management Comparisons	75
Cereal Management Centre, ALFI Project TT 22	79
Cape Mabou Community Pasture Species Demonstration	81
Tibor Oats Rate of Seeding	82
Foliar Fungicide Comparison on Winter Wheat To Control Septoria, ALFI Project # TD 32	83

CORN

Pioneer High Moisture Ear Corn Hybrid Evaluation, Stewiacke East	85
Pioneer High Moisture Ear Corn Hybrid Evaluation, Onslow	86
Kings Co. Soil & Crop Grain Corn Trial	87
Dekalb-Bishop's Grain Corn Hybrid Trial	89
ALFI Canola Production Project for 1989	90
N Application on Soybeans	91

OTHER

Screening Herbicides for Wild Oat Control In Spring Wheat and Barley, ALFI Project # TT 93	92
Fall and Spring Herbicide Treatments in Winter Wheat For Scentless Chamomile, ALFI Project # TT 93	93
Control of Triazine Resistant Lamb's Quarters in Corn	94
Control of Smooth Crabgrass in Corn	95
Barley Tolerance to Herbicides at Two Growth Stages, ALFI Project TT 93	96
Fall Round-up Application for Quackgrass Control, ALFI Project # TT 93	97
Integrated Pasture Management for Improved Weed Control, ALFI Project # TT 93	99
Screening Herbicides for Broadleaf Weed Control in Spring Wheat and Barley, ALFI Project # TT 93	101
Update on Field Crops Expo '90, July 15-18th, 1990, Wolfville, N.S., ALFI Project # TT 75	102
Organic Fertilizer	104
Annapolis Co. Soil & Crop Improvement Association Protein Crop Fungicide Trial	108
Soil & Crop Association Pasture, Haylage and Cereal Competition - Western Region	110
Subsurface Drainage Performance on a Shallow Slowly Permeable Nova Scotia Soil, ALFI Project # TD 12	112
Small Bore, Closely Spaced Tile Drainage Demonstrations	114
Horsch Seeder, ALFI Project # TT 64	116
Crop Tilter, ALFI Project # TT 130	119
Lely Mechanical Weeder, ALFI Project # TT 135	120
ALFI Evaluation of a "Grip Tracs" For A Grain & Corn Combine ..	121
ALFI Evaluation of a Grain Stripping Head On A Conventional Combine	122

PASTURE MIXTURE STUDY

Bill Thomas
Provincial Forage Specialist

Location:	N.S.A.C. Farm, Truro	Experimental Design:	Randomized Block
Soil Type:	Pugwash Sandy Loam	No. of Replicates:	3
Plot Size:	4.5m x 5m	Established:	1988
Sub Plot Size:	1.5m x 5m		
Fertilizer:	May 5/89 5-20-20 + .2B @ 400 kg/ha		
	July 14/89 5-20-20 @ 300 kg/ha		
	August 7/89 0-46-6- @ 100 kg/ha		

Plots were fertilized to take full advantage of the nitrogen fixing capability of the legumes in the mixtures. Only 35 kg/ha of actual nitrogen was applied, producing an average overall yield of 8840 kg for the 11 mixtures. Potassium and Phosphorus were applied in accordance with the soil test report.

Objective:

To evaluate species persistence and production in several commercial and recommended pasture mixtures under grazing.

Information on the performance of species such as meadow fescue, tall fescue hybrids, white clover, alfalfa, timothy, and orchardgrass in pastures is lacking. In this experiment the persistence and productivity of several species in mixture will be evaluated. It is hoped that information generated in this trial will be of assistance when designing superior pasture mixtures.

Industry has been very supportive of the project and are interested in receiving information that will help them improve their pasture mixtures.

There are eleven mixtures under test in this experiment. The trial was seeded May 28, 1988 behind the "Machinery Shed" on the Nova Scotia Agricultural College Farm. Four of the mixtures can be termed "simple mixtures" (containing only two or three species) which the Department is currently recommending. The remaining seven are commercial mixtures being sold in the region.

The percent composition of the mixtures under test are follows:

PERCENTAGE COMPOSITION OF MIXTURES

Species	Mixtures										
	1	2	3	4	5	6	7	8	9	10	11
Timothy				30	10	10	23	30	24		35
Alfalfa											65
Orchard Grass	78		29			65	25		17	29	
Ladino Clover (WH)					10	10		5	8		
Sonja Clover (WH)	22	9	8	10			8				8
Meadow Fescue					15	15	21	20		63	
Perennial Ryegrass		91			65			30	16		
Tall Fescue			63								
White Dutch Clover (WH)								5		10	
Brome Grass										25	
Alsike Clover							11	10			
Reed Canarygrass				60			12				

Experimental Design:

The experimental design is a split plot, randomized block design with three replicates. Main plots are 4.5m x 5m. In order to determine both mixture and species performance the main plots are divided into three sub-plots. Sub plots are 1.5m x 5m. At each harvest period one sub plot of each treatment was clipped to determine yield and botanical composition. Following which twelve ewes were placed in each replicate to graze for two days, approximately 6 hours each day. The ewes were removed each evening and housed without feed to encourage more vigorous grazing when they were returned the following day. A second sub plot was then clipped and botanical compositions were determined to assess animal preference and the degree of selective grazing occurring. The trial was grazed 6 times from May 17 to Sept. 29. Very good regrowth was observed after each grazing. T.D.N., A.D.F. and crude protein analysis were performed on all samples as a means of quantifying shifts in mixture quality.

Data collection commenced in the spring of 1989 and will end in the fall of 1990.

Mixtures	Harvest Date	Pre-Grazed Mean D. M. Yield (kg/ha)	Post-Grazed Mean D.M. Yield (kg/ha)	Consumption - Consumed (kg/ha)	%
1. Sonja W.C. Frode O.G.	May 17	1198	849	349	29
	June 12	1980	750	1230	62
	July 4	2082	442	1640	78
	July 31	2119	427	1792	81
	Aug. 28	1074	92	982	91
	Sept. 28	801	0	801	100
Total		9355		6794	Avg. 73
2. Sonja W.C. Valinge P.R.G.	May 17	547	18	529	97
	June 12	2258	317	1921	85
	July 4	2123	130	1993	94
	July 31	1917	32	1885	98
	Aug. 28	679	2	677	99
	Sept. 28	721	0	721	100
Total		8225		7726	Avg. 94
3. Sonja W.C. Frode O.G. Johnstone T.F.	May 17	1275	1256	19	1.5
	June 12	2118	770	1348	64
	July 4	2247	487	1760	78
	July 31	2378	364	2014	85
	Aug. 28	1413	70	1343	95
	Sept. 28	996	0	996	100
Total		10427		7480	Avg. 72
4. Sonja W.C. Farol Timothy Venture R.C.	May 17	935	71	864	92
	June 12	2144	342	1802	84
	July 4	1865	82	1783	96
	July 31	1618	13	1605	99
	Aug. 28	391	3	388	99
	Sept. 28	347	0	347	100
Total		7300		6789	Avg. 93
5. Basho Timothy Ladino W.C. Mimer M.F. Norlea P.R.G.	May 17	438	21	417	95
	June 12	2171	307	1864	86
	July 4	2002	144	1858	93
	July 31	1393	48	1345	97
	Aug. 28	768	1	767	99.8
	Sept. 28	747	0	747	100
Total		7519		6998	Avg. 93
6. Timothy Ladino W.C. Mimer M.F. Orchardgrass	May 17	1012	887	125	12
	June 12	2296	774	1522	66
	July 4	2162	411	1751	81
	July 31	2457	384	2074	84
	Aug. 28	1180	74	1106	94
	Sept. 28	803	0	803	100
Total		9912		7381	Avg. 74

Mixtures	Harvest Date	Pre-Grazed Mean D.M. Yield (kg/ha)	Post-Grazed Mean D.M. Yield (kg/ha)	Consumption	Consumed %
7. Orchardgrass	May 17	1171	651	520	44
Meadow Fescue	June 12	2013	558	1455	72
Timothy	July 4	1669	198	1471	88
Reed Canary	July 31	1919	207	1712	89
Alsike	Aug. 28	834	29	805	97
White Clover	Sept. 28	629	0	629	100
Total		8235		6592	Avg. 80
8. Timothy	May 17	452	61	391	87
Perennial Ryegrass	June 12	2514	375	2139	85
Meadow Fescue	July 4	1853	117	1736	94
Alsike	July 31	2253	12	2241	99
Ladino W.C.	Aug. 28	855	1	854	99.9
White Dutch	Sept. 28	666	0	666	100
Total		8593		8027	Avg. 93
9. Ladino W.C.	May 17	1309	693	616	47
White Dutch	June 12	2355	468	1887	80
Basho Timothy	July 4	1938	312	1626	84
Grimalda P.R.G.	July 31	2790	194	2596	93
Orchardgrass	Aug. 28	1256	14	1242	99
Tempo Bromegrass	Sept. 28	1058	0	1058	100
Total		10,706		9025	Avg. 84
10. Sonja W.C.	May 17	1210	662	548	45
Frode O.G.	June 12	1965	748	1217	62
Mimer M.F.	July 4	2184	380	1805	83
	July 31	2199	318	1881	85
	Aug. 28	1064	69	995	93
	Sept. 28	888	0	888	100
Total		9510		7334	Avg. 77
11. Apica Alfalfa	May 17	1326	676	640	48
Salvo Timothy	June 12	1850	481	1369	74
	July 4	1182	119	1063	90
	July 31	1614	111	1503	93
	Aug. 28	836	27	809	97
	Sept. 28	646	0	646	100
Total		7454		6030	Avg. 81

Animal preference between mixtures is possibly due to acceptance factors. Studies show that given the opportunity animals will selectively graze.

PASTURE MIXTURES

Bill Thomas
Provincial Forage Specialist

Location: Scothorn Farm, Hardwoodlands, Hants Co., N.S.
Soil Type: Queens Series - Fine loam, poorly drained
Experimental Design: Randomized complete block design
Plot Size: 5m x 1.5m
No. of Treatments: 10
No. of Replicates: 3
Date of Seeding: May 29, 1986
Fertilizer: May 11 - 17-17-17 @ 300 kg/ha
June 26 - 18-6-18 @ 325 kg/ha

Dry Matter Yield (kg/ha)

Mixtures	Cut June 6	Cut July 6	Cut Sept. 5	Total Yield
Venture Reed Canary, Champ Timothy, Ladino	3474	610	956	5041 a
Trefoil, Champ Timothy, Ladino	3179	513	1175	4867 a
Palaton Reed Canary, Champ Timothy, Ladino	3353	598	884	4836 a
Triple Mix Timothy, Red Clover, Alsike	3218	511	1084	4813 a
Frode Orchardgrass, Champ Timothy, Ladino	2248	532	1146	3927 b
Norlea Perennial Ryegrass, Champ Timothy, Ladino	2049	667	1147	3863 b
Trader Meadow Fescue, Champ Timothy, Ladino	2186	570	1097	3853 b
Riikka Perennial Ryegrass, Champ Timothy, Ladino	1702	563	1487	3752 b
Kenhy Tall Fescue, Champ Timothy, Ladino	2076	731	883	3690 b
Johnstone Tall Fescue, Champ Timothy, Ladino	2060	680	717	3457 b

Dry Matter Yield (kg/ha)

Mixtures	Cut 1987	Cut 1988	Cut 1989	3 Year Total Yield	Avg. Yield
*Trefoil, Timothy, Ladino	7138	11514	4867	23519	7840 a
Triple Mix	7303	10657	4813	22773	7591 a
Kenhy Tall Fescue, Timothy, Ladino	6575	11651	3690	21916	7305 ab
Venture Reed Canary, Timothy, Ladino	3466	12044	5040	20550	6850 ab
Johnstone Tall Fescue, Timothy, Ladino	4193	11719	3457	19369	6456 ab
Palaton Reed Canary, Timothy, Ladino	2949	11400	4836	19185	6395 ab
Trader Meadow Fescue, Timothy, Ladino	4433	10390	3853	18676	6225 ab
Frode Orchardgrass, Timothy, Ladino	4378	10017	3926	18321	6107 ab
Norlea Perennial Ryegrass, Timothy, Ladino	3472	9243	3862	16577	5526 b
Riikka Perennial Ryegrass, Timothy, Ladino	3211	9531	3752	16494	5498 b

* B.F.T. did not establish well. The % legumes in these mixtures declined quickly following seeding year.

**MARITIME REGIONAL RYEGRASS TRIAL 1989
ATLANTIC COMMITTEE ON CROPS**

Co-ordinator: Bill Thomas
Provincial Forage Specialist

Location: Brookside, Truro, N.S.
Soil Type: Pugwash Series - coarse loam, well drained
Experimental Design: Randomized complete block
No. of Replicates: 4
Plot Size: 5m x 1.5m
Established: 1988
Fertilizer: May 5th 17-17-17 @ 400 kg/ha
June 26th 18-6-18 @ 325 kg/ha

Dry Matter Yield (kg/ha)

Cultivar	Winter Survival (1 Poor, 9 best)	Cut 1 May 24	Cut 2 July 5	Cut 3 Aug. 10	Total Yield
Norlea	7	1230	2316	471	5017
Riikka	6	1144	3111	338	4593
Valinge	6.5	1136	3133	277	4546
Gunne	5	935	3040	345	4320
Svea	5.5	884	2883	392	4159
Bastion	3	438	2734	667	3839
Antrim	2	0	2726	735	3461
Hella	3	441	2524	378	3343
Barnasso	4	411	2285	559	3255
Belfort	1.5	108	2004	727	2839

In addition to the Perennial Ryegrass Trial in Truro, trials have been seeded and data recorded in Charlottetown, P.E.I., Fredericton, N.B. and St. John's, Nfld by Agriculture Canada. St. John's did not record any yields for 1989. Fredericton excluded Bastion, Antrim, Hella and Belfort because of their low winter survival ranging from 2-35%. The 1989 results are as follows:

<u>Brookside</u>		<u>Charlottetown</u>		<u>Fredericton</u>	
Cultivar	3 Cut Total kg/ha D.M.	Cultivar	5 Cut Total kg/ha D.M.	Cultivar	3 Cut Total kg/ha D.M.
Norlea	5017	Svea	8287	Gunne	10671
Riikka	4593	Riikka	8194	Norlea	10257
Valinge	4546	Antrim	7993	Riikka	9687
Gunne	4320	Gunne	7974	Svea	9462
Svea	4159	Valinge	7663	Barnasso	9288
Bastion	3839	Bastion	7446	Valinge	9168
Antrim	3461	Belfort	7433		
Hella	3343	Norlea	7074		
Barnasso	3255	Barnasso	6836		
Belfort	2839	Hella	6766		

Cultivar	3 Site Total Average
Gunne	7655
Riikka	7491
Norlea	7449
Svea	7302
Valinge	7125
Barnasso	6459

SORGHUM - (SUDANGRASS)

Bill Thomas
Provincial Forage Specialist

Sorghum provides a high quality forage due to its high protein and T.D.N.. However T.D.N. and protein rapidly fall off after the plant has reached boot stage. Most areas can harvest two crops and areas with C.H.U. above 2700 can expect three crops.

One precaution in growing Sorghum is prussic acid which is high in young plants and early regrowth. One should not pasture until crops reach 60-65 cm in height or immediately after it is cut for hay or green chop. If the crop is touched by frost, drought or other conditions, let it recover before pasturing. After a killing frost wait three or four days until crop turns brown before harvesting. Prussic acid concentration drops quickly after the forage is ensiled.

Sorghum (Sudangrass) was grown in three locations, two in Colchester County and one in Pictou County with the following results:

Location 1 - Pictou County

Two Cuts

First Cut Aug. 1, 1989					Second Cut Sept. 1, 1989					
Yield	DM	% DM	% CP	% TDN	Yield	DM	% DM	% CP	% TDN	Total
kg/ha					kg/ha					Yield
4013		13.84	17.6	64.4	2782		13.25	21.3	61.8	6795
2694		13.47	23.6	70.6	4579		13.47	18.0	64.1	7273
3343		14.86	22.1	70.3	3071		13.65	16.0	59.5	6414
Avg. 3350		14.05	21.1	68.4	3477		13.45	18.4	61.8	6827

Location 2 - Colchester County

One cut only

Sample # 1 Aug. 1, 1989			Sample # 2 Sept. 1, 1989			Yield
% DM	% CP	% TDN	% DM	% CP	% TDN	Kg/ha DM
12.75	15.9	64.6	18.69	7.1	62.9	8410
14.17	16.8	66.2	17.72	5.5	58.4	9923
11.91	22.6	67.8	17.01	7.6	59.1	7484
12.77	17.4	64.4				
Avg. 12.90	18.2	65.7	17.80	6.7	60.1	8605

Location 3 - Colchester County

One cut only

Sample taken Sept. 1, 1989

% DM	% CP	% TDN	Yield Kg/ha DM
20.44	11.0	63.2	9198
18.53	11.9	63.0	8894
19.24	6.4	59.2	8658

**HARDWOODLANDS FORAGE DEMONSTRATION
AND TEST SITE, EST. 1986**

**Bill Thomas,
Provincial Forage Specialist**

The Hardwoodlands Forage Demonstration and Test Site was established in 1986 at the request of the Halifax-East Hants Federation of Agriculture. The Federation wanted various recommended varieties and mixtures to be evaluated on poorly drained, finely textured soils.

The site is located on the property of Scothorn Farms Ltd., Hardwoodlands, on the corner of Highway # 14 and MacDonald Road.

There are three mixture trials and three cultivar evaluation trials at the site. This is the third year of the three year project. The data is being used to help determine those mixtures and cultivars which perform best on heavy texture, poorly drained soils.

PERENNIAL RYEGRASS SCREENING TRIAL

Bill Thomas,
Provincial Forage Specialist

Location: Scothorn Farms, Hardwoodlands, Hants Co., N.S.
Soil Type: Queens Series - Fine Loam, Poorly drained
Experimental Design: Randomized complete block design
Plot Size: 5m x 1.5m
No. of Replicates: 4
Date of Seeding: May 29, 1986
Fertilizer: May 11th, 18-6-18 @ 400 kg/ha
June 26th, 18-6-18 @ 325 kg/ha

Dry Matter Yield (kg/ha)

Cultivar	Spring Vigor (1 Poor, 10 Best)	Cut 1 June 6	Cut 2 July 6	Cut 3 Sept. 5	Total Yield
Fantoom	3	2109	1249	1619	4977 a
Gunne	6	1710	1209	1478	4397 ab
Preference	2	756	894	2125	3775 abc
Riikka	7	1118	1305	1256	3679 abc
Bardetta	2	1109	966	1467	3542 abc
Wendy	2	918	982	1625	3525 abc
Svea	5	1028	956	1529	3513 abc
DP1-6	3	820	1043	1638	3501 abc
Barnasso	4	954	1066	1302	3322 abc
Valinge	7	1262	1028	742	3032 bc
Norlea	6	1177	1085	691	2953 bc
Hella	4	895	938	961	2794 bc
Parcour	3	614	926	1228	2768 bc
Baranna	3	558	1066	1065	2689 bc
Lamora	2	523	828	1067	2418 c

Dry Matter Yield (kg/ha)

Cultivar	1987	1988	1989	3 Year Total Yield	Avg. Yield
Fantoom	5600	8135	4977	18712	6237 a
Riikka	6511	8400	3679	18590	6196 ab
Gunne	5980	7671	4398	18049	6016 abc
DP1-6	5396	8892	3500	17788	5929 abc
Svea	6341	7618	3512	17471	5824 abc
Preference	5195	8101	3775	17071	5690 abc
Barnasso	5488	7703	3322	16513	5504 abc
Bardetta	4933	7885	3542	16360	5453 abc
Valinge	6138	7032	3032	16202	5401 abc
Norlea	6402	6530	2952	15884	5295 abc
Parcour	4218	8679	2768	15665	5222 abc
Wendy	4619	7313	3524	15456	5152 abc
Hella	4434	7975	2795	15204	5068 abc
Lamora	5171	7205	2418	14794	4931 bc
Baranna	4208	7642	2689	14539	4846 c

HAYLAGE MIXTURES

Bill Thomas
Provincial Forage Specialist

Location: Scothorn Farm, Hardwoodlands, Hants Co., N.S.
Soil Type: Queens Series - Fine Loam, Poorly drained
Experimental Design: Randomized complete block design
Plot Size: 5m x 1.5m
No. of Treatments: 10
No. of Replicates: 3
Date of Seeding: May 29, 1986
Fertilizer: May 11th, 17-17-17 @ 300 kg/ha
June 26th, 18-6-18 @ 325 kg/ha

Mixtures: 80% Legume
20% Grass

Dry Matter Yield (kg/ha)

Harvest Date Harvest Date
June 6, 1989 July 25, 1989

Mixtures	D.M. Yield	D.M. Yield	Total D.M. Yield
Prosper Red Clover Vantage Reed Canary	4831	2961	7793 a
Prosper Red Clover Basho Timothy	4764	2417	7181 ab
Prosper Red Clover Climax Timothy	4614	2532	7146 ab
Prosper Red Clover Venture Reed Canary	4591	2384	6975 abc
Canada # 1 Alsike Champ Timothy	4265	2334	6599 bcd
Prosper Red Clover Kenhy Tall Fescue	3563	2964	6527 bcd
Prosper Red Clover Trader Meadow Fescue	3683	2414	6097 cde
Prosper Red Clover Saratoga Brome Grass	3728	2270	5998 de
Prosper Red Clover Carlton Brome Grass	3942	2000	5942 de
Prosper Red Clover Frode Orchardgrass	3101	2326	5427 e

Dry Matter Yield (kg/ha)

Mixtures	1987	1988	1989	3 Year Total Yield	Avg. Yield
*Canada # 1 Alsike Champ Timothy	6605	8589	6599	21793	7264 a
Prosper Red Clover Climax Timothy	6126	8433	7147	21706	7235 a
Prosper Red Clover Kenhy Tall Fescue	6523	8633	6527	21683	7227 a
Prosper Red Clover Basho Timothy	5898	8523	7181	21602	7200 a
Prosper Red Clover Vantage Reed Canary	4456	8174	7793	20423	6807 a
Prosper Red Clover Venture Reed Canary	4409	8056	6975	19440	6480 a
Prosper Red Clover Carlton Brome Grass	5491	7993	5942	19426	6475 a
Prosper Red Clover Frode Orchardgrass	4812	8798	5426	19036	6345 a
Prosper Red Clover Saratoga Brome Grass	4609	8002	5998	18609	6203 a
Prosper Red Clover Trader Meadow Fescue	4752	7244	6097	18093	6031 a

*Alsike did not survive the seed year. Yields from 87-89 are straight timothy. Red Clover reduced in % composition as years progressed.

LUNENBURG SOIL & CROP FORAGE ESTABLISHMENT TRIAL

A.J. Wilson
Soils and Crops Specialist

Co-operators: Arthur Pick, Lunenburg Soil & Crop Association

Objective: To compare annual/perennial forage establishments with and without a cover crop and to look at the use of herbicide for forage establishment.

Procedure: Three plots were established May 16, 1988 and replicated 4 times. The plots were as follows:

1. Leger, Bastion, Marino @ 150, 4 and 6 kg/ha
2. Bastion and Alouette @ 4 and 10 kg/ha
3. Leger, Bastion and Alouette @ 150, 4 and 10 kg/ha

The following plots were sown May 23, 1989:

4. Leger, Maris Ledger @ 150 kg and 35 kg/ha
5. 2,4-D, Dicamba, Maris Ledger @ 35 kg/ha
6. Leger, Maris Ledger @ 55 and 35 kg/ha
7. Leger, Lisard @ 150 and 35 kg/ha
8. Maris Ledger @ 35 kg/ha
9. Leger, Apica, Frode @ 150, 10 and 5 kg/ha
10. Leger, Apica, Frode @ 55, 10 and 5 kg/ha
11. Frode, Sonja, 2,4-DB-2-4D (16-1) @ 7 & 2 kg/ha
12. Apica, Frode @ 10 and 5 kg/ha
13. Leger, Farol, Altaswede @ 150, 6 and 4 kg/ha
14. Leger, Champ, Florex @ 150, 6 & 4 kg/ha
15. Leger, Farol and Marino @ 150, 6 and 4 kg/ha
16. Leger, Frode and Sonja @ 150, 7 and 2 kg/ha
17. No herbicide, Frode, Sonja @ 7 and 2 kg/ha
18. Leger, Frode, Sonja @ 55, 7 and 2 kg/ha

Leger - barley

Maris Ledger - annual ryegrass tetraploid

Lisard - annual ryegrass

Bastion - perennial ryegrass

Florex & Marino - red clover, double cut

Altaswede - red clover, single cut

Sonja - white clover (intermediate)

Alouette & Apica - alfalfa

Frode - orchardgrass

Farol-champ - timothy

Fertilizer Rate: At planting, 12-24-24 @ 375 kg/ha on legume & legume mixes.

At emergence, 34-0-0 @ 88 kg/ha

**Grasses &
Barley:**

At seeding, 0-20-20 @ 450 kg/ha

At emergence, 34-0-0 @ 220 kg/ha

After 1st cut, 34-0-0 @ 150 kg/ha on all non-legume plots

Table 1: Forage Establishment Trial - 1988

Cultivar	Cut 1 kg/ha	Cut 2 kg/ha	Cut 3 kg/ha	Total kg/ha	% P	% TDN	Replacement Value P & TDN (\$/ha)
Leger 150, Bastion, Marino Clover	2299	1325	587	4211	17	72	1019
Leger 150, Bastion, Alouette	1718	1313	1079	4110	18	73	1028
Bastion, Alouette	-	1145	1103	2248	20	72	581

Table 2: 2nd Year - Forage Establishment Trial - 1989

Cultivar	Cut 1 kg/ha	Cut 2 kg/ha	Cut 3 kg/ha	Total kg/ha	% P	% TDN	Replacement Value P & TDN (\$/ha)
Leger 150, Bastion, Alouette	4190	3631	1790	9611	21	66	1793
Bastion, Alouette	3506	4104	1630	9240	20	66	1726
Leger 150, Bastion, Marino Clover	4347	3479	1234	9060	20	66	1688

Table 3: Year 1 and 2 - Forage Establishment Trial

Cultivar	Total kg/ha	Replacement % P & TDN (\$/ha)
Leger 150, Bastion, Alouette	13721	2821
Leger 150, Bastion, Marino	13271	2707
Bastion, Alouette	11488	2307

Table 4: Annual Ryegrass Establishment Trial - 1989

Cultivar	Cut 1 kg/ha	Cut 2 kg/ha	Cut 3 kg/ha	Total kg/ha	% P	% TDN	Replacement Value P & TDN (\$/ha)
Leger 150, Maris Ledger	1311	3088	2788	7187	22	69	1374
Herbicide, Maris Ledger	847	3147	2646	6640	23	70	1282
Maris Ledger	769	2714	2346	5829	23	71	1137
Leger 55, Maris Ledger	1210	2414	2033	5657	22	70	1091
Leger 150, Lisard	1463	3117	826	5406	19	64	965

Table 5: Perennials Established 1989

Cultivar	Cut 1 kg/ha	Cut 2 kg/ha	Cut 3 kg/ha	Total kg/ha	% P	% TDN	Replacement Value P & TDN (\$/ha)
Leger 150, Farol, Altaswede	1429	2687	953	5069	21	70	981
Leger 150, Farol, Sonja	1735	2627	626	4988	21	71	967
Leger 150, Frode, Sonja	1350	2609	994	4953	22	71	961
Leger 55, Frode, Sonja	841	2697	1251	4789	20	71	931
Apica Frode	00	4667	00	4667	17	70	900
Frode Sonja	00	3548	1097	4645	20	72	911
Leger 150, Champ, Florex	1515	2393	573	4481	21	70	865
Leger 55, Apica Frode	891	3003	00	3894	22	73	769
Leger 150, Apica Frode	1258	1564	00	2822	20	71	550
Herbicide, Frode, Sonja	00	208	1704	1912	24	68	364

* Established 1988

	Cut 1	Cut 2	Cut 3	Total
LSD .05	370	576	402	1348

1. Dollar value 1988 based on corn at 202.82/tonne
48% soybean meal @ \$448.10/tonne
2. Dollar value 1989 based on corn at 174.00/tonne
48% soybean meal @ \$342.00/tonne

A maximum of 17% was placed on % P to work out the dollar value of Protein.

DISCUSSION:

Annual Ryegrass Establishment

By adding a cereal to annual ryegrass in 1987, the yield of the first cut was nearly triple that of ryegrass alone. Similar results were achieved in 1988. In 1989 adding a cereal at a high rate to annual ryegrass resulted in significantly higher yields on the first grazing (Table 4). Using a herbicide to control weeds did not affect annual ryegrass growth significantly, but did add to cost of production.

Perennial Forage Establishment

In the establishment year, 1988, (Table 1) adding a cereal to an alfalfa perennial ryegrass mix added an extra cut during the growing season and doubled the forage output and return per hectare.

Adding a cereal did not affect forage establishment in the year following seeding. No significant yield differences were noted in 1989, (Table 3).

In general, those forages established in 1989 with a heavy cereal cover crop out-yielded those mixes that were sown with a light cover crop or no cover crop. The one yielding the least was herbicide and no cover crop.

The one exception was the Apica Frode mixture with no cover crop out-yielding the other two treatments with a cover crop. The one cut taken from the Apica Frode and no cover crop was 90% red root pigweed. Red root pigweed was also prevalent in the other two plots and was not readily controlled by clipping as the other annual weeds leading to stiff competition to the alfalfa.

CONCLUSION:

Over a two-year period, the addition of barley at a maximum rate of 150 kg/ha and cut pre-heading has helped to establish clean forage stands and to increase productivity in the year of establishment and not affect productivity of the perennial in the year following establishment.

Red root pigweed in high concentrations may adversely affect establishment of alfalfa. In such cases, the use of a herbicide to control red root pigweed may be warranted.

ANNAPOLIS COUNTY SOIL AND CROP SEED TREATMENT AND ITS EFFECT ON FORAGE ESTABLISHMENT

A.J. Wilson
Soils and Crops Specialist

Co-operator: John Lawrence

Objective: To look at Forage establishment using three different seed treatments compared to no seed treatments and measure their effect on forage productivity over a two year period.

Procedure: Prillion-coated and non-treated seed of Iroquois alfalfa was supplied by Halifax Seed Company in 1988. The non-treated seed was split three ways. One-third of the seed was inoculated, one-third was inoculated and treated with Anchor seed treatment. The remaining one-third was left untreated and used as a control.

Anchor seed treatment containing Thiram was used to help control Verticillium wilt. Anchor was applied @ 150 ml/25 kg of seed. Plots were undersown with a cover crop of barley in the third week of May, 1988.

A second cut of straight alfalfa was taken on the 24th of August, 1988. (See Table 1)

Table 1: 1988 Second Cut Yield Data

Treatment	kg/ha	% P	% TDN	\$ Replacement Value TDN & P
Inoculated	3000	22	77	843.00
Control	2940	22	75	815.00
Prillion-coated	2730	22	77	767.00
Anchor + Inoculant	2640	25	77	791.00

Dollar value 1988 based on corn @ \$202.00/tonne and 48% soybean meal @ \$448.00/tonne.

Table 2: 1989 & Total Year 1 & 2 Yield Data

Treatment	1989 kg/ha	Total kg/ha	\$ Replacement Value TDN & P	% P	% TDN
Anchor + Inoculant	11,385	14,025	2910	23	63
Inoculated	8,095	11,095	2340	22	65
Control	8,018	10,958	2377	23	71
Prillion-coated	7,872	10,602	2243	20	67

Dollar value 1989 based on corn at \$174/tonne and 48% soybean meal at \$342.00/tonne.

Discussion:

In the establishment year, inoculation alone was the best treatment. Inoculation plus anchor suppressed establishment. This suppression was caused as a result of the sticker impeding seed flow making it necessary for someone to follow the seeder to ensure all runs were sowing. In year two, the Anchor plot performed very well. As a result both inoculated plots out-yielded the non-inoculated plots (Table 2). Verticillium was absent from all plots. Therefore Anchor's effect on Verticillium was not a factor.

Table 3: Soil Analysis Report

pH	P ₂₀₅	K ₂₀
6.5	H-	H

Prillion-coating did not help either in establishment or in the year following establishment at this site. Table 3 shows that this site had good P₂₀₅ levels and on such sites where the P₂₀₅ is high, Prillion-coating may not need to be added.

Conclusions:

The yield differential between control and inoculated treatments more than paid for using the inoculant.

FORAGE CUTTING DATE STUDY

Peg Cummings
Crop Specialist

In 1988, a forage cutting date study was conducted in Inverness County on five perennial forage mixes to determine their optimum harvest dates. In 1989, this project was continued on two sites in Cape Breton County and two sites in Inverness County. Data gathered included crude protein, TDN and dry matter yield, with the aim of again determining optimum dates of harvest for high quality forage.

Table 1 lists the forage mixes chosen, year seeded and fertility applied. Representative areas were chosen within each field and left unharvested for the duration of the study. Yields and fresh forage samples for lab analysis were taken from a 1m² area on a more or less weekly basis, starting June 6 and finishing June 27, 1989. (The exception to this was the alfalfa/brome area which was inadvertently harvested before the last 1m² cut could be taken).

It should be noted that all results presented will be higher values than under actual harvest conditions as normal harvest losses such as respiration, wilting and storage losses do not occur to as great an extent with this type of sampling method.

Estimates for date of harvest are given for each forage type to achieve a high forage quality.

Table 1

County	Species/Variety	Year Seeded	Spring Fertility	Total N kg/ha
Cape Breton	Common Triple Mix	1987	560 kg/ha 12-24-24	68
Cape Breton	Saranac Alfalfa 80% Saratoga Brome 20%	1987	200 kg/ha 5-10-30, 3B	10
Inverness	Basho Timothy 70% Marino Red Clover 30%	1987	300 kg/ha 5-10-45	15
Inverness	Francis Perennial Ryegrass 40% Richmond Timothy 40% Ladino White Clover 20%	1987	300 kg/ha 18-6-18	54

Triple Mix (Figure 1)

Crude protein and energy levels (TDN) declined at a near linear rate for this forage over the three week period. C.P. levels decreased an average of .14% per day, with the highest rate of decrease occurring between June 14-20. TDN levels decreased most rapidly between June 6-14 with an average daily drop of .29% over the three week period. Of the four mixes tested, triple mix had the lowest CP and TDN average daily decline which was probably due to the observed low number of legume plants in the forage stand. Yield increased at a near linear rate with the highest dry matter gain occurring between June 14-20 (279 kg/ha dry matter/day), slowing to one-third the rate after this period.

Harvest of this mix before June 14 would have resulted in a very high quality forage. However, harvest of timothy before the late boot to early heading stage can result in thinning of the stand. It was noted that the timothy was in the late boot stage prior to June 20. Therefore, harvest of the triple mix forage between June 14-20 (weather conditions permitting) would have resulted in a fair quality forage of approximately 12% CP, 62% TDN, and 6 t/ha dry matter (2.7 t/ac).

Alfalfa/Brome (Figure 2)

Quality dropped rapidly between June 6-14, resulting in a decrease of .91%/day crude protein and 1.05%/day TDN during this time period. The overall quality decline was the highest for the alfalfa/brome (.59%/day C.P. and .84%/day TDN) in comparison with the other forages tested. Yield increased rapidly (287 kg/ha dry matter/day) during the June 6-14 period.

Harvest of alfalfa/brome on or before June 14 would result in a high quality forage of + 15% C.P., + 60% TDN, and 5 t/ha dry matter (2.25 t/ac). Fifty-six percent of the yield increase occurred during June 6-14, therefore harvest after June 14 would result in very little addition to yield, and a lower quality forage.

Timothy/Red Clover (Figure 3)

A linear decline in crude protein and TDN occurred with this forage mix. Between June 20-27, C.P. levels increased, but this was probably due to an error in sampling in which a high percentage of legume was taken in the forage sample on June 27. There was also a high contamination of couchgrass in this stand which was not apparent until the third week of sampling. Couchgrass loses quality very quickly and the contamination probably influenced the C.P., TDN and yield levels throughout the sampling period. Quality loss was the highest during June 6-14 (.28% C.P./day and .61% TDN/day) with an overall loss of .23% C.P./day and .42% TDN/day. The greatest yield increase occurred between June 14-20 (292 kg/ha dry matter/day).

Harvest of this mix prior to June 20 would have resulted in a high quality forage; however cutting of timothy prior to the late boot to early heading stage can result in reduction of timothy stands. Yield increases after June 20 were minimal; therefore harvest on or before this date would have resulted in good quality 11% C.P., 67% TDN and 5 t/ha dry matter (2.25 t/ac) forage.

Perennial Ryegrass/Timothy/White Clover (Figure 4)

This mix had one of the lowest rates of quality decline over the three week period. Crude protein and TDN declined most rapidly during the June 20-27 period (.30% C.P./day and .76% TDN/day). Over the 21 day period C.P. recorded a loss of .20% day and .40%/day TDN. Yield increased most rapidly between June 14-20 (305 kg dry matter/day).

Severe lodging had occurred by June 14 due to a heavy rain storm, and the ryegrass was completely headed by June 20, which would account for the rapid TDN loss after this date.

Harvest on or before June 20 (weather permitting) would have resulted in a good quality forage of approximately 12.5% C.P., 65% TDN and 6 t/ha dry matter (2.7 t/ac). Yield increase after this period was minimal and quality losses rapid, therefore substantially lowering forage quality.

Table 2

Quality Loss Over 3 Week Period June 6 - 27, 1989

Forage Mix	% C.P.		Avg. Daily % C.P. Loss	% TDN		Avg. Daily % TDN Loss
	June 6	June 27		June 6	June 27	
Triple Mix	14.0	11.3	.14	68.0	61.9	.29
Timothy Red Clover	14.4	12.9	.23 *	73.1	64.1	.42
Alfalfa Brome	23.4	14.5	.59 *	75.7	63.6	.84*
Perennial Rye Timothy White Clover	14.7	10.4	.20	68.8	59.9	.40
Average			.29			.49

* 14 day period

Table 3

Yield Increases Over 3 Week Period

Forage Mix	Daily Dry Matter Yield Increases kg/ha			21 Day Period
	June 6-14	June 14-20	June 20-27	
Triple Mix	153	279	96	176
Alfalfa Brome	287	110	-	199 *
Timothy Red Clover	158	292	22	157
Perennial Rye Timothy White Clover	165	305	88	186
Average	191	247	69	180

* 14 Day Period

Conclusion

The decrease in forage quality (crude protein and TDN) declined at different rates for the forage species tested, but generally the drop in quality was greatest during the early to mid part of June (Table 2). The exception here was the Perennial Ryegrass/Timothy/White Clover mix which had a faster drop in quality in the latter part of June. The Alfalfa/Brome mix had the highest C.P. and TDN loss over the three weeks while Triple Mix recorded the lowest C.P. and TDN loss.

Protein levels were very good on the first sampling date with an average daily loss of .29% for all mixes combined over the three week period. Final protein levels for all mixes were below the crude protein standard of 15% by June 27. TDN levels were also excellent on June 7 and generally did not fall below the TDN standard of 60% by June 27. Average daily TDN % loss for all mixes was .49%.

With the exception of the Alfalfa/Brome mix which increased greatly in yield in early June, all other mixes had their highest dry matter yield increase between June 14-20. (Table 3) After this date, yield increase was minimal. Harvest of forage after June 20 (June 14 for Alfalfa/Brome) did not add to quantity and greatly decreased quality. Therefore, there is a critical period for harvest, depending on the species involved, that will result in a high quality forage (depending of course on weather conditions).

Results presented are from one year and indicate a trend only. However, the principle that an early forage harvest will result in higher forage quality without too much sacrifice in quantity has been demonstrated.

FIGURE 1

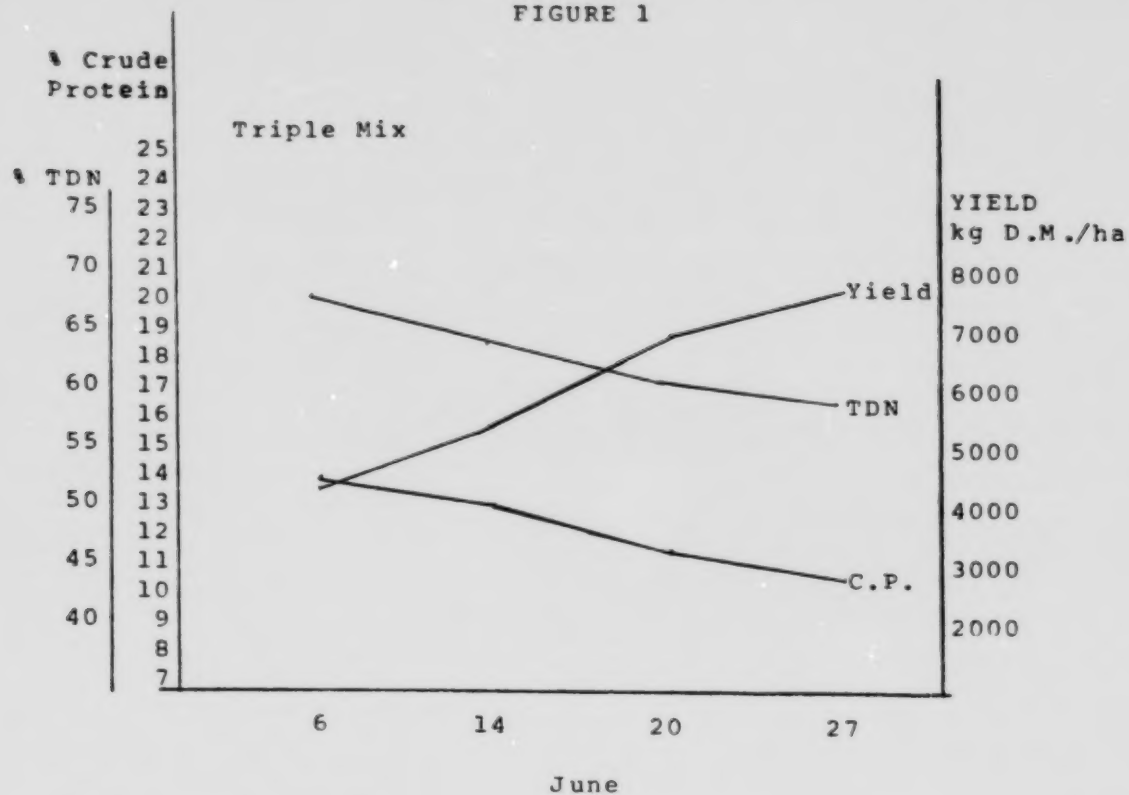


FIGURE 2

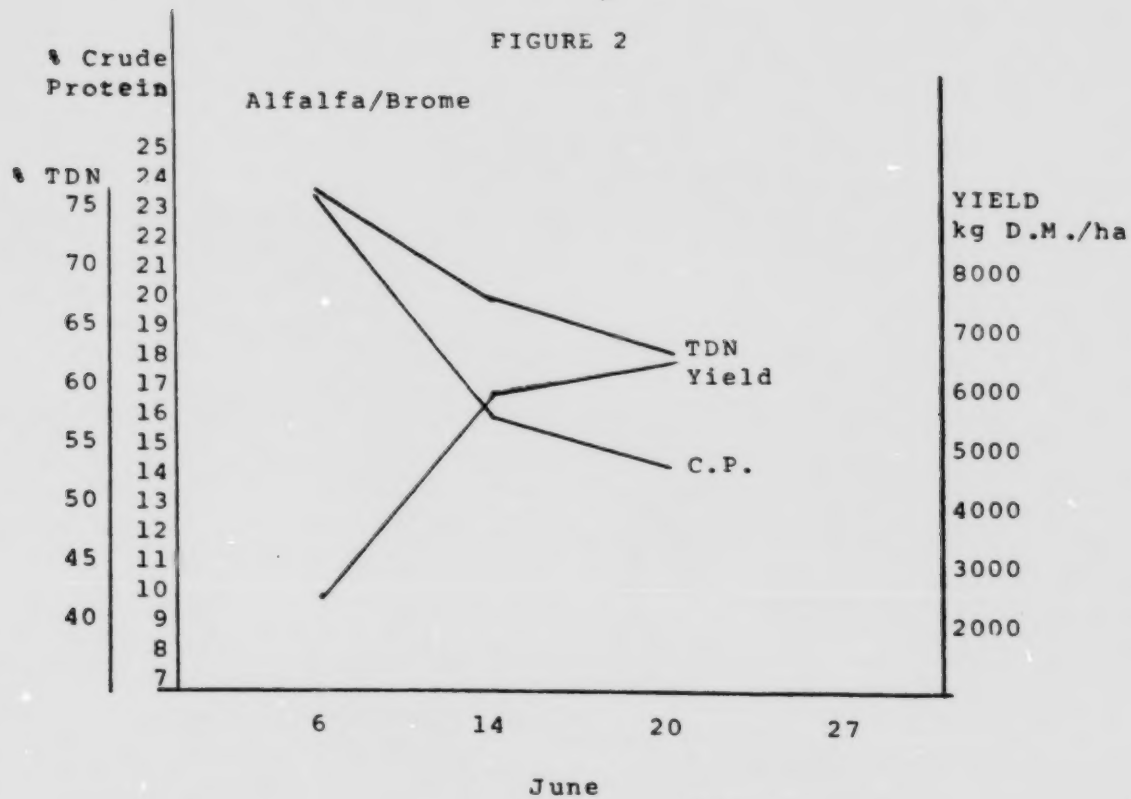


FIGURE 3

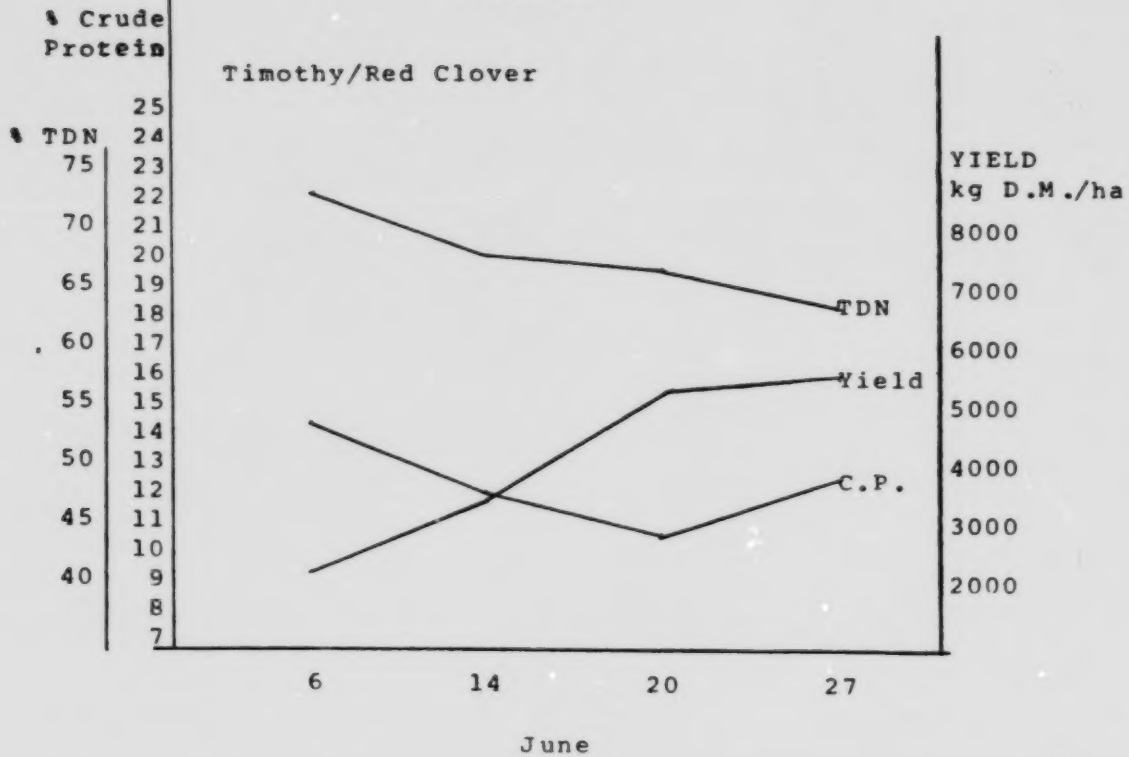
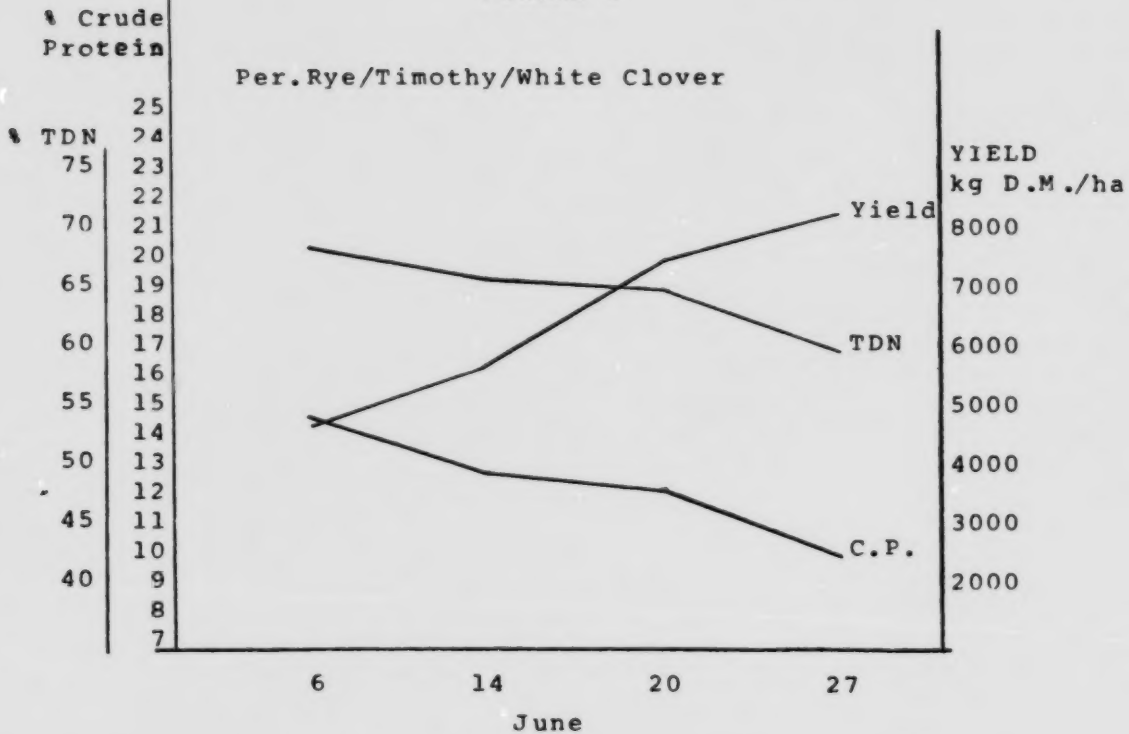


FIGURE 4



FORAGE QUALITY MONITORING PROJECT

Eric Bosveld
Soil and Crop Specialist

Considerable attention in the last few years has been paid to forage quality. The primary factor affecting the quality of forage stored as hay and haylage is the date of the first cut. It is well known that as forage plants mature the crude protein and the total digestible nutrients decline, however, the rate at which this decline occurs is dependent upon numerous interacting factors. Soil type, day and night temperatures, rainfall and species are some of these factors determining the "ideal" cutting date for any particular region. One must consider the interacting factors, the class and type of livestock being fed and the yield needed to obtain the herd's winter forage requirements.

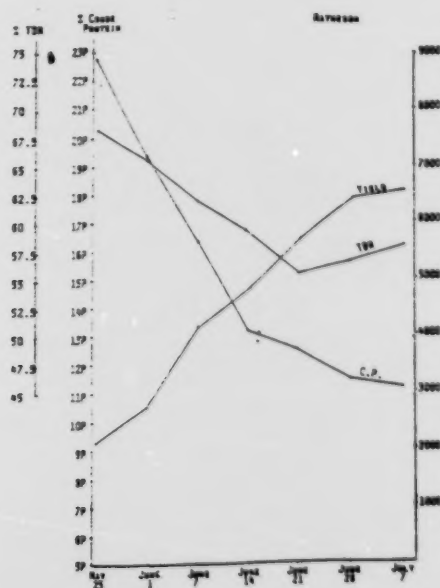
A demonstration project was set up at Winnie Matheson's in Middle Stewiacke and at Donald Kennedy's in Upper Stewiacke to monitor the decline in quality of the first crop and the increase in yield from May 25th to July 7th. A representative area of the field was staked off for use as the sampling area and the co-operators were asked to leave this area uncut until July 7th. Each week, three square meter yields were taken as well as fresh forage samples for lab analysis. The results are reported in Figures 1 and 2.

Winnie Matheson

An alfalfa/timothy field at the farm of Winnie Matheson's in Middle Stewiacke was selected for the project. Approximately 10% of the ground area was alfalfa and the remainder was predominately timothy. This field received a good coat of manure in the spring which stimulated the growth and competitiveness of the timothy portion of the crop.

The soil of the selected field has been classed as a Stewiacke fine loamy alluvium (i.e.: water deposited sediments) according to Federal Soil Survey Maps. These soils have deep friable profiles and are considered to be imperfectly to poorly drained partially due to high water tables in the spring and fall.

Figure 1



The crude protein dropped from 22.8% C.P. to 11.2% C.P. over the entire six week period, however 84% of this drop occurred in the first 20 days. During this early period the crude protein declined 0.49 percentage points per day, whereas the average for the entire sampling period was 0.28.

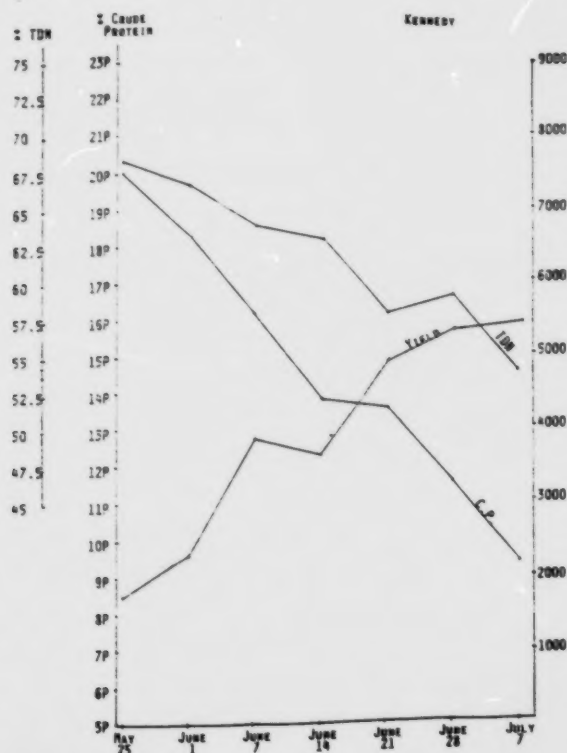
The T.D.N. (total digestible nutrients) also declined over the sampling period. On May 25th the TDN was 68.6% (dry matter basis) and dropped to a low of 55.9% on June 21st, an average of 0.47 percentage points per day. As indicated in Figure 1, the T.D.N. increased on the last two sampling dates, however when the raw data was examined a little closer it was noted that two of the three samples at each date had TDN's hovering around 55-56%. The third sample in each case increased the average TDN level. This may be due to the undergrowth of the second crop in the sample which would improve the TDN level.

The yields increased rapidly during the first five weeks of the sampling period and tended to level off somewhat by the sixth week. During this period the yields more than tripled and averaged a gain of approximately 105 kg D.M./day.

Donald Kennedy

The second site for the Forage Quality Monitoring Project was an alfalfa/timothy field at Donald Kennedy's farm in Upper Stewiacke. The field received approximately 37 t/ha of cattle manure over the winter and 280 kg/ha of 5-20-20 + .2B was applied in the early spring. The ground area consisted of approximately 50% alfalfa and 50% timothy. According to Federal Soil Survey Maps, the soil belongs primarily to the Herbert soil group which is a coarse loamy-gravelly glaciofluvial soil (sediments deposited by glacial rivers) that is rapidly drained.

Figure 2.



The crude protein dropped from 20.0% to 9.5% during the sampling period which was an average of 0.25 percentage points per day. However, almost 60% of this drop occurred in the first three weeks of the sampling period.

The TDN also declined from a high of 68.4% on May 25th to a low of 54.4% on the 7th of July, an average drop of 0.33% percentage points per day. The TDN increased from June 21st to June 28th according to the results, however when the raw data was examined a little closer, it was noted that one of the three samples threw off the average. It is postulated that there may have been some of the second crop growth in the sample.

The yield at Kennedy's tripled over the six week period and tended to level off near the end of June and early July. The average gain per day was approximately 84 kg D.M./ha/day.

The 1989 results from both sites clearly indicates the importance of early cutting dates in the Middle and Upper Stewiacke regions when attempting to obtain a high quality forage. It must be remembered that the quality data shown was taken from fresh forage samples and therefore losses in protein and energy from cutting, wilting, handling, harvesting and storing operations are not accounted for. The amount of losses occurring from these operations can vary tremendously, depending on numerous factors, however they must be considered when determining the optimum date of cutting. A general rule of thumb often used is a loss of 2-3 percentage points of protein and 5 percentage points of TDN for the cutting, wilting, handling and harvesting operations for a haylage system. These may be conservative estimates and losses and generally tend to be somewhat higher for hay systems. Storage losses can also vary but tend to be higher with a haylage system, especially if stored at an inappropriate moisture content. Dry matter yield losses have also not been considered and therefore actual on-farm harvested yield would be somewhat lower than is indicated on the graphs.

FORAGE ESTABLISHMENT DEMONSTRATION

Eric Bosveld
Soil and Crop Specialist

An unreplicated, strip trial was set up at Frank MacKenzie's in Upper Stewiacke to examine the pros and cons of various methods of alfalfa establishment. The site selected was mapped as a Stewiacke soil (fine, loamy alluvium, ie: water deposited sediments) that is imperfectly drained partially due to high water tables in the spring and fall. The soil analysis was as follows:

O.M.	pH	P ₂₀ ₅	K ₂ O	Ca	Mg
4.9	5.6	L-	L+	L	M

Dolomitic limestone was applied at a rate of 7.4 tonnes/ha and incorporated before seeding. The treatments are described in Table 1.

Table 1: Forage Establishment Treatments

Trt. No.	*Code	Seeder	Alf/Tim (kg/ha)	N (kg/ha)	**P ₂₀ ₅ (kg/ha)	**K ₂ O (kg/ha)	***Barley (kg/ha)
1	DSB	Brillion	22	30	120	120	0
2	DSD	Drill	22	30	120	120	0
3	LBF	Drill	22	52	121	121	75
4	HBG	Drill	22	52	121	121	180
5	LBG	Drill	22	52	121	121	75
6	HBG	Drill	22	52	121	121	180

*DSB- Direct Seed Brillion
DSD -Direct Seed Drill
LBF- Low- (rate) Barley Forage
HBG- High-Barley Forage
LBG- Low-Barley Grain
HBG- High-Barley Grain

** Treatments 1 and 2 received all P₂₀₅ and K₂O at seeding, whereas treatment 6 received 72% in the spring and the remainder was broadcast on the surface in the early fall.

*** The barley was seeded at the indicated rates and harvested as forage in treatments 3 and 4 and as grain in treatments 5 and 6.

The trial was seeded early in June (due to a delay in the lime delivery and spreading). Each treatment plot was approximately 0.4 hectares (1 acre) in size.

The specific objective of each treatment was slightly different and were managed in a manner that is fairly typical in the Province. Additional nitrogen was supplied for the barley nurse crop treatments 3 and 4 (LBF, HBF) and for treatments 5 and 6 (LBG, HBG) where the barley was harvested for grain. The primary objective of treatments 1 (DSB) and 2 (DSD) is to establish the alfalfa so that production year yields are high, whereas the yield in the establishment year is somewhat less important. The inclusion of

the barley nurse crop as in treatments 3 (LBF) and 4 (HBF) is intended to (in treatments 3 and 4 and harvested as dry grain in 5 and 6), increase establishment year yields without compromising production year yields (this will be determined next year). The primary objective of treatment 6 (HBG) is to obtain a decent grain yield and the underseeding is a secondary objective, whereas treatment 5 (LBG) is a compromise of both.

On July 20th, 5 square meter yields per plot were taken on treatments 1-4 as well samples for quality analysis. The original intension was to clip early for weeds in treatments 1 (DSB) and 2 (DSD), however due to time constraints, the first crop was harvested, weeds included. The barley in treatments 3 (LBF) and 4 (HBF) headed out approximately one week prior to harvest. Ideally it should have been cut at the boot stage (ZGS 45) which would have occurred some time in the first week of July. Wrapped roundbale haylage was made of treatments 1-4. Grain yields of treatment 5 (LBG) and 6 (HBG) were determined using the highway scales by weighing the grain harvested from the entire plot. The results of year 1 are reported in Table 2.

Table 2: Yields and Quality

		Forage Yield (D.M./ha)	Grain Yield (kg/ha)	D.M.	C.P.	T.D.N.
# 1	DSB	2236	-	12.6	29.4	72.1
# 2	DSD	2488	-	13.5	29.4	72.0
# 3	LBF	5605	-	17.9	19.2	61.9
# 4	HBF	5839	-	21.2	15.5	60.6
# 5	LBG	-	2548	88.9	14.7	70.8
# 6	HBG	-	2782	90.1	15.2	70.5

There was virtually no difference in quality of the alfalfa established with a Brillion or a grain drill as indicated in Table 1. There was only a slight yield advantage when direct seeded with a grain drill, however, it is questionable whether the difference was significant since yield variation within the plots was greater than the yield differences.

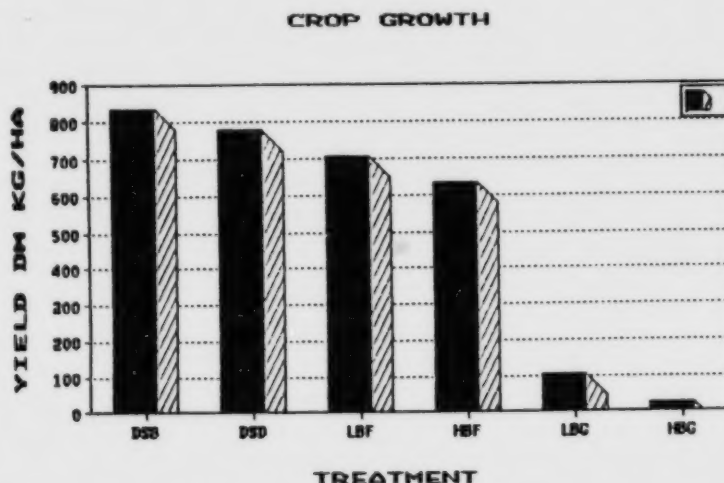
When barley was used as a nurse crop, the yield more than doubled when compared to the direct seeded treatments. The high rate of barley resulted in a slight improvement in yield, although again it is questionable whether the difference is significant due to within plot yield variation. The use of a nurse crop dramatically reduced the crude protein and energy levels by over 10 percentage points each. Increasing the rate of barley reduced the protein level further and increased the dry matter. Eventhough, protein and TDN levels are good for both groups of treatments, it could be argued that the protein levels of treatments 1 (DSB) and 2 (DSD) were excessive, but it must be remembered that these were fresh forage samples and therefore do not take into account losses from cutting, wilting, handling, harvesting and storing. In fact, samples taken when the haylage was baled approximately 3 days later indicated a loss of 3.8 to 5.4 percentage points of protein and 3.3 to 11.0 percentage points of TDN.

One of the primary objectives when using a barley nurse crop is to obtain two decent cuts in the first year. Unfortunately due to a late seeding and dry weather this aspect could not be demonstrated in this trial.

The high rate of barley harvested as grain (HBG) yielded slightly more than when seeded at a low rate but it is questionable whether there is enough of a difference to deem significant. There was virtually no difference in quality or dry matter levels.

On October 31st, two square meter yields were taken per plot to document the regrowth of the various treatments and the amount of growth going into the winter. The results are reported below in Figure 1.

Figure 1.



The regrowth after cutting was not observably different between the two direct seeded treatments (DSB and DSD) although the Brillion appeared more uniform. After the barley was harvested as forage, regrowth of the underseeded alfalfa was substantially poorer than with the direct seeded treatments. However it must be remembered that all the P and K fertilizer was incorporated in the direct seeded treatments, whereas only part of the required P and K was incorporated with the nurse crop (LBF, HBF) and grain (LBG, HBG) treatments with the remainder broadcast later in the season. Regrowth and development of the underseeded alfalfa was slower when the high rate of the barley nurse crop was used. However, by the end of October the differences in regrowth of treatments 1-4 were not nearly as apparent as earlier in the season. Poor establishment occurred in both nurse crop treatments (LBF, HBF) where the barley lodged, although the extent and severity was greater in the high rate treatment.

The regrowth of alfalfa after the barley was harvested as grain was virtually non-existent. It was difficult to even find an alfalfa plant in the high rate treatment (HBG) just before the grain was cut. The regrowth after harvest indicated in Figure 1 was primarily barley fallout. The competition exhibited by the high rate of barley (HBG) was so severe that the majority of plants died. The alfalfa establishment when the low rate of barley was used and harvested as grain was somewhat better but much worse than either the nurse crop treatments or the direct seeded treatments. In all likelihood, due to the dry weather, competition for low available soil moisture may have magnified the results.

This trial will be carried on for at least one more year to monitor the first production year yields of the alfalfa.

PASTURE MIX PREFERENCE AND PERSISTENCE DEMONSTRATION

Eric Bosveld
Soil and Crop Specialist

Location: Old Barns, Colchester County
Co-operators: George and John Dickie
Seeding Date: May 22, 1989
Preceding Crop: Annual Ryegrass
Seeding Method: Brillion
Plot Size: Approximately 1 hectare
Design: Unreplicated
Soil Type: Truro Sandy Loam
Soil Analysis: pH O.M. P₂₀₅ K₂O Ca Mg
6.4 7.0 222(H-) 121(M-) 2552(M-) 490(H-)
Fertility: 400 kg/ha 5-10-30 worked in at seeding

With the exception of a few trials in the Maritime Provinces, pasture species are evaluated in simulated rotational grazing trials that utilize a mechanical harvester. This method measures differences in productivity but fails to assess the performance of the species in recommended mixtures under actual grazing conditions. This demonstration will examine the performance and the persistence of new pasture species and varieties under cattle grazing pressure. Furthermore, the cattle will have access to three mixtures simultaneously and observations will be made on their preference.

The following mixtures were seeded on May 22, 1989:

Block 1

Sonja White Clover @ 2.5 kg/ha
Frode Orchardgrass @ 5.0 kg/ha
Johnstone Tall Fescue Hybrid @ 15.0 kg/ha

Block 2

Sonja White Clover @ 2.5 kg/ha
Kay Orchardgrass @ 5.0 kg/ha
Ensign Meadow Fescue @ 15.0 kg/ha

Block 3

Sonja White Clover @ 2.5 kg/ha
Kay Orchardgrass @ 5.0 kg/ha
Riikka Perennial Ryegrass @ 15.0 kg/ha

Due to the difficulty in controlling the rate of seeding when the small white clover seed is the only species used in the small seed box of the Brillion, a considerably higher rate of Sonja white clover was broadcast on part of Block 3. The Sonja on the remainder of the pasture was seeded by hand two days later which resulted in strips of clover since the broadcaster was not distributing the seed evenly. These strips will hopefully be corrected by an early frost seeding.

Nevertheless, yields were determined on August 28, 1989 with the following results:

<u>Block</u>	<u>Yield</u> <u>(kg d.m./ha)</u>	<u>% Crude</u> <u>Protein</u>	<u>% TDN</u>
1	2928	16.8	64.3
2	2766	16.0	61.4
3a (extra seed)	2230	23.2	69.7
3b	2628	15.5	63.9

The perennial ryegrass, orchardgrass and white clover mixture yielded somewhat less in the establishment year than the other two mixtures. However its yield was reduced further when measured in the area that received the extra seed.

The protein was dramatically higher in the heavily white clover seeded area, which would be expected. The energy level was also somewhat higher. There were no substantial differences in quality between the correctly seeded blocks, although the perennial ryegrass was slightly lower in protein.

Next year, the real objective of this trial will begin. Cross fences will be put up across the individual blocks, so that the cattle can be rotationally grazed and be given the opportunity to graze each of the three mixtures according to their preference.

PICTOU CO. SCIA FORAGE DEMONSTRATION SITE

Eric Bosveld
Soil and Crop Specialist

Location: Durham, Pictou County
 Preceding Crop: Orchardgrass
 Plot Size: 5m x 5m
 Design: Unreplicated
 Seeding Date: June 24, 1988
 Co-operator: Arnold (Junior) Cock
 Soil Type: Morristown Coarse Loamy
 Soil Analysis: pH O.M. P_2O_5 K_2O Ca Mg
 6.5 6.5 1106(H+) 499(H+) 4053(M) 1062(H+)

Fertilizer: 230 kg/ha 17-17-17 (May 4, 1989)
 225 kg/ha 17-17-17 (June 19, 1989)
 100 kg/ha 34-0-0 on Plot 5 (August 3)

In June of 1988, thirteen mixtures were established to demonstrate the production and vigor of newer varieties of forages. The pasture mix plots were harvested five times in order to simulate rotational grazing and the haylage mixtures were harvested twice. The pasture mix results are recorded in Table 1 and 2 the haylage mix results in Table 3. Yields were determined by clipping and weighing two, one square meter areas per plot and two fresh forage samples were taken for lab analysis.

Table 1: Pasture Mix Total Yields and Quality

	Yield	C.P. (kg/ha) (% x Yield)	TDN (kg/ha) (% x Yield)
1. <u>Bastion</u> perennial ryegrass <u>Sonja</u> white clover	8712	2220	6223
2. <u>Mimer</u> meadow fescue <u>Sonja</u> white clover	8867	2432	6361
3. <u>Kay</u> orchardgrass <u>Johnstone</u> tall fescue hybrid <u>Sonja</u> white clover	8416	2193	5978
4. <u>Kay</u> orchardgrass <u>Sonja</u> white clover	8899	2240	6286
5. <u>Kay</u> orchardgrass	7109	1514	4740

Table 2: Pasture Mix Yields and Quality

	<u>May 18</u>			<u>June 12</u>			<u>July 13</u>			<u>August 2</u>			<u>August 30</u>		
	Yield	C.P.	TDN	Yield	C.P.	TDN	Yield	C.P.	TDN	Yield	C.P.	TDN	Yield	C.P.	TDN
1. <u>Bestion perennial</u>															
<u>Ryegrass</u>															
<u>Sonja white</u>															
clover	1328	33.2	79.3	2754	24.6	67.3	2032	22.8	70.4	1535	24.2	72.0	1063	25.1	73.4
2. <u>Minor meadow</u>															
<u>fescue</u>															
<u>Sonja white</u>															
clover	1983	32.6	74.7	2486	25.6	67.7	2007	26.8	72.0	1368	25.4	72.4	1023	25.8	74.4
3. <u>Key orchardgrass</u>															
<u>Johnstone tall</u>															
<u>fescue hybrid</u>															
<u>Sonja white</u>															
clover	2036	29.8	71.0	2208	25.0	70.1	2052	24.6	70.8	1321	25.3	72.7	799	24.5	71.5
4. <u>Key orchardgrass</u>															
<u>Sonja white</u>															
clover	1989	28.4	72.6	2414	24.5	69.6	2366	24.7	70.0	1350	22.5	69.9	780	25.1	72.0
5. <u>Key orchardgrass</u>															
	2078	24.9	70.0	1851	18.6	63.4	1738	20.9	66.7	729	17.1	66.0	713	23.0	66.1

Considering the dry weather in July and August, yields of the pasture mixtures were excellent. The Kay orchardgrass when grown alone yielded less than when white clover was included because only 111 kg N/ha was supplied. White clover has the ability to supply considerably high amounts of nitrogen to the companion grass. The Sonja white clover and Kay orchardgrass was the highest yielding mixture and when Johnstone tall fescue hybrid was included with these species, it yielded the lowest. Most of the yield advantage occurred early in the season. Johnstone tall fescue normally produces a substantial portion of its yield in the summer and fall but this may have been masked by the dry weather and the fact that yields were not taken late in the season.

The total amount of crude protein and total digestible Nutrients produced per hectare were calculated by multiplying the individual yields and quality and by totalling them over the five cuts. The white clover mixtures produced substantially more protein and energy than the orchardgrass alone. The meadow fescue/white clover mix produced the most protein and TDN of all the pasture mixtures.

Table 3: Haylage Mix Yields and Quality

	<u>June 12</u>			<u>August 12</u>			<u>Total</u>		
	Yield	C.P.	TDN	Yield	C.P.	TDN	Yield (kg/ha)	C.P. (kg/ha) (\$ x Yield)	TDN (kg/ha) (\$ x Yield)
7. <u>Venture</u> reed canary grass <u>Marino</u> red clover	5995	16.1	57.3	3604	16.5	61.8	9599	1560	50.2
8. <u>Basho</u> Timothy <u>Marino</u> red clover	6488	14.0	57.8	3394	18.0	65.3	9882	1519	50.6
9. <u>Climax</u> Timothy <u>Florex</u> red clover	5499	14.3	58.5	3275	18.8	64.9	8774	1402	50.2
10. Borden's special Triple Mix	6484	13.5	56.3	3582	14.5	60.4	10066	1395	50.4
11. <u>Basho</u> Timothy <u>Apica</u> alfalfa	5317	15.3	54.0	4535	18.3	58.1	9852	1643	50.6
12. <u>Saratoga</u> Bromegrass <u>Apica</u> alfalfa	5647	15.5	56.9	4334	17.9	58.7	9981	1651	57.7
13. <u>Apica</u> alfalfa	5574	18.8	57.2	4468	20.5	66.2	10042	1964	61.46

The yields of the haylage mixtures were also excellent considering the weather. The pure stand of alfalfa yielded more than when either brome grass or timothy was included, although it is questionable whether it is significant. It was surpassed only by the triple mix, although by only 24 kg/ha which would not be considered to be significant.

The average yield of the alfalfa mixtures was approximately 4% higher than the clover mixtures and this was primarily due to its superior regrowth under the dry conditions.

The climax timothy/Florex red clover yielded substantially less than all other mixtures.

Even though the Triple Mix yielded the highest, it produced the least amount of protein. There was certainly less clover present, but obviously enough to supply some nitrogen to the timothy crop which resulted in an excellent yield. Individual samples demonstrated the dramatic protein variability in this plot which depended on the sampling area and the clover content.

The alfalfa alone yielded more protein and energy per hectare than any of the other mixtures. Generally, the alfalfa mixtures yielded more protein than the clover mixtures and similar amount of T.D.N..

It must be remembered that square meter yields do not take into account losses of protein, T.D.N. and dry matter by cutting, wilting, handling, harvesting and storing. Therefore actual on-farm yields and quality would be somewhat lower.

WHITE CLOVER FROST SEEDING PROJECT

Eric Bosveld
Soil and Crop Specialist

Location:	Scotsburn, Pictou Co.	Co-operator:	Sandy Stewart			
Soil Analysis:	pH	O.M.	P ₂₀ ₅	K ₂ O	Ca	Mg
	6.4	9.8	401(H+)	289(H-)	4817(M+)	764(H)

Design: Unreplicated field size

The costs associated with conventional plowing and reseedling of pastures has led to the examination of several alternative methods of pasture renovation, including frost seeding. Also, often the topography of pastures does not lend itself well to conventional renovation. Frost seeding involves broadcasting the seed early in the spring to capitalize on early spring moisture and freezing/thawing cycles, hopefully to enable good soil-seed contact and subsequent germination. This is the second year of a project at Sandy Stewart's to investigate the potential of frost seeding. Last year's results are reported in the 1988 Project Summary booklet published by the Soils and Crops Branch.

The pasture selected for this year's project was predominately native grasses and some wild white clover. In September of 1988 it was sprayed with 2,4-D at 2.2 l/ha with a check strip left unsprayed on the Eastern side. The pasture was grazed closely in the fall of 1988 to reduce the competitiveness of the sward in the spring and 3.7 t/ha of limestone was applied in October. On April 10, 1989, 2.5 kg/ha of Sonja white clover was broadcast with a cyclone seeder on part of the pasture which resulted in the following treatments:

Treatments

1. Unsprayed, unseeded
2. Sprayed, unseeded
3. Sprayed, seeded

On April 12, the temperature dropped to approximately -3° C and it snowed lightly on the 16th and the 23rd of April. There were no heavy rains until the end of April. No fertilizer was applied in the spring and the first grazing occurred on May 20th. The co-operator used the pasture for night grazing and therefore it was more or less continually grazed, although it had a rest period of about a week in the middle of August. On July 1st it received 225 kg/ha of 12-24-24 with an equal application on the 15th of August. It was clipped once, immediately preceeding the first fertilizer application. Pasture cages were used to evaluate the yield four times over the spring and summer with the following results:

Table 1: Yields and Quality of Frost Seeding Treatments

<u>Treatment</u>	<u>May 18</u>			<u>June 19</u>		
	<u>Yield</u>	<u>C.P.</u>	<u>TDN</u>	<u>Yield</u>	<u>C.P.</u>	<u>TDN</u>
1. Unsprayed, unseeded	1521	34.0	74.9	2512	24.2	65.5
2. Sprayed, unseeded	1560	33.0	75.3	2352	22.3	65.0
3. Sprayed, seeded	1125	25.0	74.0	2523	30.9	58.9

<u>Treatment</u>	<u>July 10</u>			<u>August 30</u>			<u>Total</u>
	<u>Yield</u>	<u>C.P.</u>	<u>TDN</u>	<u>Yield</u>	<u>C.P.</u>	<u>TDN</u>	
1. Unsprayed, unseeded	1185	25.9	67.5	886	23.7	68.5	6104
2. Sprayed, unseeded	1225	23.3	69.8	1055	25.9	71.8	6192
3. Sprayed, seeded	658	18.2	67.8	1103	20.1	72.8	5409

Based on the above results there would appear to be no advantage in spraying or frost seeding a pasture. However, there was only one cage per treatment and the results within each treatment were highly variable. The cage in treatment 3 was placed on a knoll and perhaps the drought became a factor. On the lower imperfectly drained end of the pasture there was considerably more white clover and the majority was determined to be Sonja. Often it was difficult to distinguish between the wild white clover and the Sonja, especially where it was closely grazed, however, in the undergrazed areas around the manure paddies the large leaved Sonja predominated. The best catch of white clover appeared to be in areas where the predominant grasses were bluegrass and other native species, as opposed to the areas where orchardgrass from a previous seeding predominated. However, due to the variability of the results within the pasture, the use of frost seeding could be considered at best as a method of prolonging the useful life of a pasture sward. In the context of this demonstration, it is no substitute for conventional plowing and reseeding. A newly seeded (conventionally) strip of Sonja white clover, Farol timothy and Ensign meadow fescue will be compared next year to the frost seeding treatments.

WHITE CLOVER DEMONSTRATIONS

Eric Bosveld
Soil and Crop Specialist

A number of white clover demonstrations were established in 1989 in an effort to evaluate the performance and persistence of Sonja, a newly registered and recommended variety. The check variety Sacramento was also established at the majority of locations. Huia, a commercially available smaller leaf type will be examined at three locations and one farmer has tried White Dutch clover. The following is a summary of the co-operators involved and the varieties compared at each location.

<u>Co-operator</u>	<u>Sonja</u>	<u>Sacramento</u>	<u>Huia</u>	<u>White Dutch</u>
Hugh Browning, Pictou Co.	x			
Gordon Jorgenson, Col. Co.	x			
Martin Lund, Col. Co.	x	x	x	x
Bernie MacDougall, Antigonish Co.	x	x	x	
Varis Rieksts, Antigonish Co.	x	x		
Harry Vanderlinden, Antigonish Co.	x	x		
John Vanderlinden, Antigonish Co.	x	x		
Mike Vermeer, Antigonish Co.	x	x	x	

The white clover demonstrations have been seeded in various combinations with orchardgrass, timothy, meadow fescue, and creeping red fescue. Seeding date ranged from early May to mid summer. Some were harvested for silage, others were grazed this past year. The soil type ranges from well drained coarse soils to somewhat poorly drained basal till soils.

Next year, pasture cages will be used to evaluate the relative yield and quality of the mixtures.

**NEW AND IMPROVED PERENNIAL PASTURE MIXTURES DEMONSTRATION
ALFI PROJECT # TT109**

**Eric Bosveld
Soil and Crop Specialist**

The following is the first interim report of an ALFI technology transfer project (TT109) initiated in 1989.

Background

During a Central Nova Scotia Soil and Crop Improvement Association Directors Meeting in the fall of 1988, there was considerable discussion on the merits and demerits of annual ryegrass and improved perennial pasture mixtures. It was decided that a project should be undertaken by the Association to quantify the merits of improved perennial species and that perhaps it should center on the use of improved white clovers. Lloyd Yuill agreed to participate in the project and selected a field which had been in annual ryegrass for 4 consecutive years. He needed species that were high in quality to produce milk comparable to production levels achieved on annual ryegrass. He also needed a legume that would persist under grazing conditions. Work at N.S.A.C. clearly indicated that improvements in white clover yield and persistence could be made with small plot, simulated grazing trials, however, there lacked "on farm" information under actual grazing conditions.

Establishment

In the fall of 1989, 40 t/ha of cattle manure and 5 t/ha of lime were worked in on field # 12 of the co-operator's farm. On April 27, 1989, 200 kg/ha of 17-17-17 was applied and the field was seeded two days later. Various difficulties arose with the seeding of the first paddock, primarily due to the Brillion seeder being used. A considerably more accurate Brillion was obtained to seed the remainder of the field. The seeding rates of the various species were corrected by hand seeding and were determined to be as follows:

Paddock 1 (1.3 ha)

area 1	2.8 kg/ha Sonja White Clover
(0.38 ha)	11.3 kg/ha Kay Orchardgrass
	34.4 kg/ha Ensign Meadow fescue

area 2	2.8 kg/ha Sonja White Clover
(0.92 ha)	4.4 kg/ha Kay Orchardgrass
	13.0 kg/ha Ensign Meadow fescue

Paddock 2 (1.3 ha)

	2.8 kg/ha Sonja White Clover
	5.5 kg/ha Kay Orchardgrass

Paddock 3 (1.3 ha)

	2.8 kg/ha Sacramento White Clover
	5.5 kg/ha Kay Orchardgrass

The meadow fescue in the heavily seeded area of paddock 1 appeared to be the first to emerge, however increased plant density is suspected to be the reason for this observation. This area remained thicker through a significant portion of the growing season. By May 23rd, the clover was at the unifoliate stage. The development of all species demonstrated was excellent over the next few weeks and the plots were clipped in June for weed control. Regrowth after clipping was excellent and by July 27th it was approximately one foot in height. On recommendation of the Project Leader the three mixtures were cut and allowed to wilt for haylage. It was felt that an inadequate sod had been formed to support livestock and that the new, tender seedlings would be subjected to severe trampling damage. Square meter yields were taken on July 25th with the following results:

	D.M. Yield (kg/ha)	Crude Protein	Total Digestible Nutrients
Paddock 1 (average)	3740	19.2%	66.8%
area 1	3638	18.7%	68.3%
area 2	3841	19.6%	65.2%
Paddock 2	3431	21.3%	70.0%
Paddock 3	3070	22.1%	69.7%

With demonstration trials such as these, it is often difficult to suggest that differences in yield and quality are entirely due to genetics, since considerable variation can occur within treatments. However, three square meter yields were taken per plot and the stands were relatively even which resulted in minimal variation within mixtures. Therefore it can be suggested that meadow fescue improved yield and tended to decrease protein (as would be expected). Sonja tended to yield higher in mixtures with orchardgrass than Sacramento. However, it was noted early in the establishment of the pasture that there seemed to be a slightly better catch of Sacramento and that Sonja seemed to catch up later on. This could perhaps explain the elevated protein level of Paddock 3 and its slightly lower yield.

It was interesting to note that when the co-operator mentioned that 7 loads of haylage had been removed from the entire field, the yield was determined to be approximately 3500 kg D.M./ha (based on wagon loads of 1900 kg D.M.).

There were some weeds in the first cut of haylage (primarily mustards), although there was virtually no regrowth and they posed no subsequent problem.

The co-operator started to feed the haylage produced by the project. While maintaining milk production, he was able to reduce the protein level of his dairy ration from 16% to 14%, reduce short feed consumption by 130 lbs (for 30 cows) per day and reduce 44% topdress feed consumption by 44 lbs. per day. Although much of this could be attributed to the high quality white clover, the use of haylage instead of hay was also a major factor.

The development of the mixtures after the July cut was excellent considering the conditions. Unfortunately no grazing data was obtained during the summer due to unusually dry conditions. However, it was stockpiled for a light grazing on October 20th and 21st. Thirty cows grazed for two consecutive days (7 hours grazing each) on the entire pasture (3.9 ha). Due to the amount of growth, the weather conditions following October 21st, and the difficulty in fencing the paddocks individually for such a short period of time, differential grazing results of the various species were not obtained in 1989. However, slight grazing pressure did occur and therefore this will be reflected in the complete data scheme that will be obtained next year.

EVALUATION OF AN INTENSIVE PASTURE MANAGEMENT
PROGRAM FOR NATIVE PASTURE SPECIES
ALFI PROJECT # TT120

Joe Cooper, Assistant Agricultural Representative
Eric Bosveld, Soil and Crop Specialist

This is a summary of the first interim report of an ALFI technology transfer project (TT120). Good pasture management has been promoted for decades as a means of improving animal productivity, however reseeding of improved species and fertilization along with rotational grazing have been the principle components promoted.

High start-up costs have been partially responsible for the lack of adoption of this technology in the beef industry. The objective of this project is to demonstrate an improvement in productivity of native pastures by intensive management. A step by step approach has been taken to demonstrate the various components of improving pasture management of native swards on two cow-calf operations in Cumberland County. Their situations are described separately.

Roy Black

- Farm program
- cow-calf, 35 cows
 - presently pastures a significant number of his cows at a pasture approximately 10 miles away.
 - the home farm has a roadside native pasture which has been overgrazed in the past.

The soil analysis results of the native pasture (at the home farm) was as follows:

O.M.	pH	P ₂ O ₅	K ₂ O	Ca	Mg
4.5	5.3	L	M-	L	M-

The pasture was rectangular in shape and divided into four paddocks (approximately 1 hectare each) with one strand of plastic electric fence wire.

Fertilizer (15-5-15) at a rate of 275 kg/ha was applied on May 22nd.

Lime was applied on June 2nd at a rate of 4 tonne/ha on the sod even though the soil test called for more (the rate considered to be the maximum when incorporation is impossible).

The electric fence did not provide an adequate shock to contain the cow herd which limited the number of yield determinations obtained and essentially invalidated the yield data.

This problem was corrected by the purchase of a new fencer, however, regrowth had been seriously affected by the drought by this time. An observed advantage of rotating, even in mid-summer, was the proliferation of white clover throughout the sward which prevented a complete shortage of grass.

Brian Trueman - Thunderbrook Polled Herefords

- Farm Program - 35 cow-calf pairs
- primarily pastures away from home farm
- had a 15 acre roadside native pasture which was overgrazed and characteristically unproductive in the past

The soil analysis results are shown below:

O.M.	pH	P ₂ O ₅	K ₂ O	Ca	Mg
6.3	6.1	H-	M-	L	M

Management

The cattle were turned out on May 19, 1988 and removed on October 13, 1989. The 15 acre pasture was divided into five paddocks and periodic access to two more paddocks containing annual ryegrass was provided after July 15th. The paddocks were set up in the manner shown in Figure 1, and received the following fertilizer and lime treatments.

May 12, 1989 - 105 kg/ha 46-0-0

May 13, 1989 - 4 t/ha Dolomitic limestone

June 14, 1989 - Paddocks 1, 2, 3 - 150 kg/hya 18-6-18

The stocking rate consisted of 17 cows, 14 calves, 1 horse and 1 bull.

The yields were determined by clipping and weighing the forage produced in 10 randomly placed 1/4 m² quadrants. This was done both before and after grazing to determine the wastage. The yields of each paddock are shown below in Table 1.

Table 1: Forage Yield (kg/ha)

<u>Paddock No.</u>	<u>Fertilized</u>	<u>Non-fertilized</u>
1	6799	-
2	6757	-
3	8631	7783
4	6740	6499
5	8563	-

There were no yields taken to evaluate the lime vs. no lime treatments because the application affected the grazing pattern and because a surface application would not fully react in one year. The quality analysis of the pasture showed no appreciable difference between the fertilized and non-fertilized areas.

The forage yields vary between paddocks. Yields were not taken from Paddocks 1 and 2 in May because the cattle were turned out a few days before the entire fence was set up to give them time to adjust which resulted in overgrazing of paddocks 1 and 2. Therefore, the rotation started with paddock 3.

Due to uneven grazing patterns, it was difficult to measure losses by trampling, fouling, etc. The measured losses ranged from 20-70%, however the accuracy of this could easily be questioned.

The total grazing season consisted of 147 days, with three grazings per paddock of 9-10 days each. In 1988 (a wet summer), this pasture was continuously grazed resulting in a shortage of forage during mid summer. With controlled grazing by rotating the cattle (in a dry summer), the pasture produced more feed than in the past and the co-operator considered increasing the stocking rate. However, due to the poor reputation of native swards (especially when continually grazed) it was decided to maintain the initial stocking rate. It became very apparent that the paddocks could not be overgrazed since this seriously inhibited regrowth of the sward.

Although no cattle weights were monitored due to the lack of a control plot, the co-operator felt that both his calves and cows were heavier going into the winter than in previous years. This can be attributed to the change in pasture conditions associated with rotational grazing of the native sward. It becomes apparent that the most important first step in improving pasture productivity is to control the grazing. Next year the pasture will be subdivided further, to further improve the grazing control and to increase the stocking rate. Frost seeding will be tried as well as the monitoring of individual steer weights.

**VERTICILLIUM WILT RESISTANT ALFALFA
CULTIVAR ADAPTABILITY TRIAL**

**Y.A. Papadopoulos, Agriculture Canada
W.G. Thomas, N.S. Dept. of Agriculture & Marketing**

This project was initiated at the Experimental Farm (Nappan) to demonstrate the adaptability of verticillium wilt alfalfa cultivars to Cumberland County conditions. The trial was seeded on May 30. Planting and growing conditions were excellent and a successful trial was established. One cut was harvested on August 28 and yield data are recorded in table 1. All cultivars produced excellent herbage dry matter (DM) yield. Persistence and DM yield will be obtained and reported for the next three production years. This project was partially supported through P.E.P. employment program provided by the Nova Scotia Department of Agriculture & Marketing.

**Herbage Dry Matter Yield (DM)
during the establishment year (1989)**

Entrv	VW*	DM Yield (kg/ha)
Arrow	R	2623
Barrier	R	3328
Bell Ringer	MR	3126
Centurion	R	3558
DK 125	R	3006
Oneida VR	R	3279
G2852	R	3142
Pinnacle	R	3017
Profit	R	3771
Shield	R	2623
Sparta	R	2886
Sure	R	3607
Surpass	R	3006
Ultra	R	3279
Verta+	R	2640
WL316	MR	3552
5432	R	3738

* Verticillium wilt disease rating:

HR = Highly resistant (more than 50% resistant plants)
R = Resistant (31 to 50% resistant plants)
MR = Moderately resistant (15 to 30% resistant plants)
S = Susceptible (less than 15% resistant plants)

A.L.F.I. EVALUATION OF A VREDO NO-TILL FORAGE SEEDER

Herman Mentink, Pier Wiersma & Dabro Farms - Co-operating Farmers
Jack van Roestel, Crops Extension Specialist

Re-establishing superior forage species in runout pasture and hayland can be an expensive task from a tillage standpoint. In 1988, eight Kings County farmers developed an A.L.F.I. project to evaluate a machine that will hopefully reduce re-seeding costs and still produce a high yielding stand. The Vredo no-till forage seeder being tested, can seed forage directly into stubble or sod ground, eliminating the tillage practices associated with a conventional Brillion seeding approach.

In 1988, the Vredo drill was used on a total of 54 ha (135 ac.) in Kings County with mixed results occurring which were reported at that time (Refer to 1988 Soils & Crops Project Results Booklet).

Last year, the project co-operators used the drill on 22 ha (55 ac.) to establish annual ryegrass or perennial pasture, interseed orchardgrass into a dense alfalfa stand, seed a haylage mixture into barley stubble, and rejuvenate a dykeland hayfield with timothy. (See Table 1)

Table 1: VREDO NO-TILL FORAGE ESTABLISHMENT IN 1989

H. MENTINK (GRAND PRE)

- April 29, May 1, May 23 (11.2 ha total)
- Field # 1, upland soil, interseeded 7 kg/ha orchardgrass into a dense alfalfa stand that was Brillion seeded in '88
- Field # 2, upland soil, no Round-up used, interseeded 35 kg/ha Aubade annual ryegrass into rundown pasture
- Field # 3, upland soil, no Round-up used, interseeded 7 kg/ha orchardgrass into a hay field
- Field # 4, dykeland soil, no Round-up used, interseeded 16 kg/ha of timothy into a thin '88 underseeded "triple mix" establishment

DAVISON'S/DABRO FARMS (GASPEREAU)

- May 22, 23 (5 ha)
- Field # 1, upland soil, spring Round-up, seeded a perennial ryegrass-meadow fescue-ladino clover pasture mix into sod
- Field # 2, dykeland soil, spring Round-up, seeded an alfalfa-red clover-grass mix into barley stubble

P. WIERSMA (BISHOPVILLE)

- May 24 (4 ha)
- Field # 1, upland soil, spring Round-up, seeded annual ryegrass pasture on ryegrass sod

CURRY'S (HORTONVILLE)

- early July (2 ha)
- Field # 1, upland soil, Round-up/2,4-D herbicide used, seeded alfalfa mix into old hayfield

Co-operator's Observations:

The following comments were prepared by the farmers that have utilized the Vredo no-till forage drill, on the majority of the acreage seeded.

"I think the Vredo No-Till seeder was a good investment because we established a good alfalfa-timothy stand with little cost (no ploughing or harrowing) on a field that was annual ryegrass the previous year.

We also interseeded a good orchardgrass stand in a thick alfalfa field, and established a lot of timothy in an underseeded barley field that had a very poor catch from the previous year.

Overall, I think you can save a lot of time with this machine especially in the spring, when time is so valuable."

Herman Mentink

"The Vredo No-Till Seed Drill has proven to be an excellent investment. Pasture renovation was impossible in the past because of rocky conditions. The forage that grew there was unimproved and not very productive. By spraying with Round-up and then using the Vredo No-Till Seed Drill we have been able to establish an excellent forage stand. In another field, alfalfa was seeded over grain stubble on marshland with amazing results. The seeder seems to be very versatile. It has been used on different soil types with excellent results."

Shawn Davison

"We have used the Vredo No-Till seeder for the last two years. The first year I was not all that enthusiastic about the results. I sprayed Round-up/2,4-D, waited five days, and seeded annual ryegrass into an old hayland sward. The start was rather slow and the stand was thin probably because it was in competition with the old sod. In 1989, I used the same field for no-till seeding. The sod was much thinner because of winterkilled annual ryegrass. In mid-May, I sprayed with Round-up, waited five days, and harrowed the field prior to seeding with a pasture harrow (chain harrow). The germination was excellent, I had a thick stand and an excellent crop.

After two years experience I can say that I am very pleased with the Vredo No-Till seeder; it is a fast and simple way to renovate your pasture and hayfields compared to the conventional way of ploughing, harrowing, rockpicking and so on."

Pier Wiersma

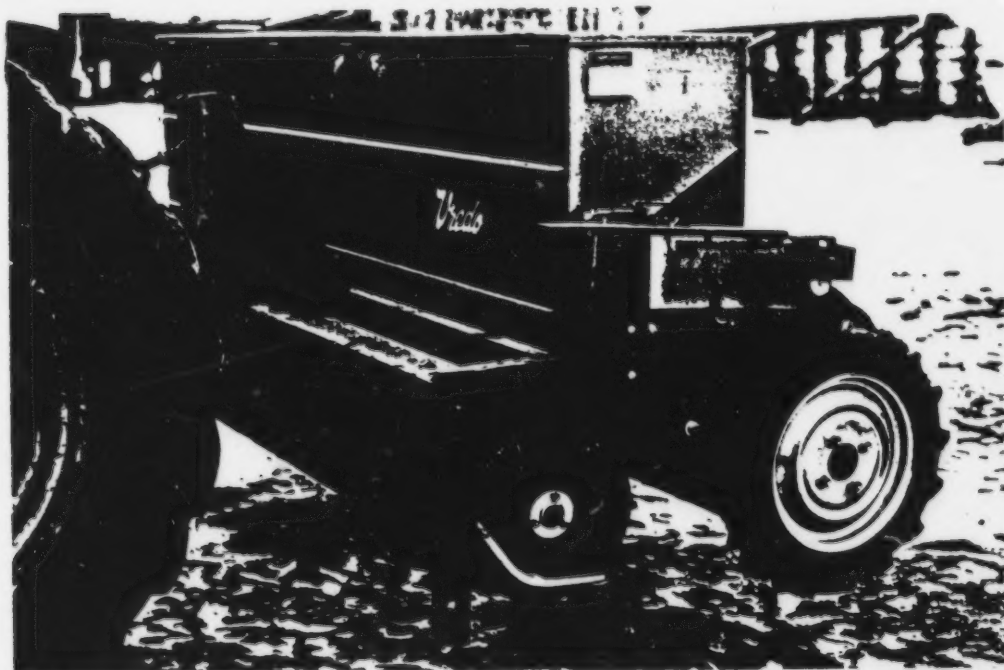
Conclusions:

The Vredo no-till forage seeder has done a good job for the most part, in establishing forages in various crop and soil conditions. The Kings County farmers that have utilized this machine have found that proper operating techniques usually consist of spring Round-up application, prior chain harrowing of old sod (in some situations) followed by shallow seed placement with the drill into a "warm" soil.

The Vredo drill is ruggedly built, easily adjusted for seeding rate, however, very heavy to transport on the 3-point hitch of smaller tractors. This sturdy machine is built to last, operates easily and lends itself well to co-operative ownership because of the few days use it would receive on most farms annually.

Forage stand establishment with the Vredo no-till drill compared to the conventional Brillion seeding approach can be much slower sometimes in the seeding year. However, the general end results in establishing forages with the Vredo, coupled with substantial tillage, rockpicking, and labour costs savings have satisfied us to an extent that we would recommend this machine to others.

During the evaluation term of this project, several tours and articles have been done to communicate our experiences with this machine. We thank the A.L.F.I. program for the financial support to purchase and evaluate the Vredo no-till forage drill and encourage everyone to view this machine at Field Crops Expo '90 site at Sheffield Mills, Kings County (July 16 & 18, 1990).



WINTER WHEAT DATE OF SEEDING IN CAPE BRETON

Peg Cummings,
Crop Specialist

Location: Skye Glen, Inverness County
Design: Unreplicated field demonstration
Plot Size: 2.0 ha
Co-operating Farmer: Herman van den Heuvel
Preceding Crop: Grass Forage
Seeding Dates: August 29
September 7
September 13
September 18
Seeding Rate: 450 seeds/m²
Fertility: 200 kg/ha 17-17-17 at seeding

Winter wheat cultivars Monopol and Absolvent were seeded on a more or less weekly basis in the fall of 1988 to determine the date of seeding for winter wheat in Cape Breton. Early fall seeding may result in excessive leaf growth and smothering under snow cover, while late fall seeding restricts root growth and food reserves. Plants in the 3-4 leaf stage will generally survive the winter better than plants with few leaves.

Due to wet field conditions in the fall and spring, weed control was not applied and grass weed pressure was high throughout the trial area and contributed to yield loss. Winter kill was not severe but was evident, particularly in the early seeded stands. Disease pressure was minimal over the season, however 250 ml/ha Tilt fungicide was applied as a precaution prior to heading. Plant growth regulators were not applied as the correct growth stage for application was missed. Lodging was also minimal over the trial area. A total of 170 units of Nitrogen was applied during seeding, ZGS 21 (tillering), and ZGS 45 (boot).

Plant population counts were higher for both Monopol and Absolvent for the last two dates of seeding (Table 1), with little difference in plant number between cultivars for all four dates. However, yields were substantially higher for Monopol over the last three dates of seeding, and tended to fluctuate in yield whereas Absolvent maintained a more steady yield rate over the four seed dates (Table 2). Absolvent tends to be more winter hardy than Monopol and will most likely perform more consistently over a range of fall seeding dates than Monopol. Date of seeding for Monopol may tend to be more of a critical factor for plant survival and yield than for Absolvent.

Protein levels were higher for both cultivars with the early seed dates, indicating that the last N applications were at the proper time for kernel protein production in early vs. later date of seeding (Table 3).

Generally, a mid-September date of seeding rather than an early seeding may be necessary for winter wheat production in Cape Breton. Data presented is from one year, one site and one set of yearly weather patterns and therefore indicates a trend only. The trial will be continued to try to determine a more accurate date of seeding for winter wheat.

Yields are considerably lower than provincial average and reflect the need for proper site selection, fertilization, weed control and date of seeding for successful winter cereal production.

TABLE 1

<u>Cultivar/Date</u>	<u>Plants/m²</u>			
	<u>Aug. 29</u>	<u>Sept. 7</u>	<u>Sept. 13</u>	<u>Sept. 18</u>
Monopol	354	347	449	458
Absolvent	369	360	464	464

TABLE 2

<u>Cultivar/Date</u>	<u>Cultivar Yields Over Four Seed Dates</u> <u>kg/ha</u>			
	<u>Aug. 29</u>	<u>Sept. 7</u>	<u>Sept. 13</u>	<u>Sept. 18</u>
Monopol	781	1396	1187	1989
Absolvent	984	962	751	989
Average	883	1179	969	1489

TABLE 3

<u>Cultivar/Date</u>	<u>Protein Levels (%)</u>			
	<u>Aug. 29</u>	<u>Sept. 7</u>	<u>Sept. 13</u>	<u>Sept. 18</u>
Monopol	13.9	13.6	12.8	12.9
Absolvent	13.8	13.7	12.2	12.4

WINTER WHEAT (ON-FARM) VARIETY TRIAL

Dwane Mellish,
Assistant Director

The first year trial to evaluate winter wheat varieties on the farm in two different regions of the province. The two co-operators were Peter Clarke (Woodville, Kings Co., N.S.) and Mr. Philip Pedersen (Nappan, Cumb. Co., N.S.).

Nine varieties Absolvent, Borden, Karat, Heinrich, Monopol, Perlo, Rector, Urban and 1959-W1-2 were evaluated under the co-operators field management protocol.

The trials were established in a replicated small plot trial in an existing winter wheat field, so the co-operator could manage the trial in conjunction with his own management regime by using his own field scale equipment.

Both locations had technical problems which resulted in the dropping of the Nappan location and a reduction of data collected at the Valley site.

No statistical analysis was performed on the data but the average of the four replications for the Valley site are tabulated below.

Woodville Winter Wheat Site (1989)

	Yield (t/ha)	1000 k.wt. (g)
Absolvent	4.9	51
Borden	5.3	47
Karat	5.8	45
Heinrich	5.9	47
Monopol	5.0	44
Perlo	5.7	47
Rector	5.7	43
Urban	5.4	45
1959-W1-2	6.2	51

These trials have been re-established at the two locations for the 1989-90 growing season with an increased number of varieties.

WINTER WHEAT PRODUCTION MANAGEMENT TRIAL

Dwane Mellish,
Assistant Director

This is an ongoing trial to test the response of winter wheat to four levels of management. This trial is repeated at five locations in the Maritime Region. This project is partially funded by the Canada/Nova Scotia Agri-Food Agreement.

Location:	Brookside	Co-operator:	
Preceding Crop:	Annual Ryegrass	Soil Type:	Sandy Loam
Seeding Rate:	400 seeds/m ²	Harvest Date:	August 10
Seeding Date:	Sept. 8	Experimental Design:	Split Plot
Plot Size:	1.25m x 6m	Fertilization:	400 kg/ha 5-20-20
Varieties:	Absolvent, Borden, Karat, Monopol, Perlo & TW-1		
Herbicide:	Glean 18 g/ha, ZGS 23		

Management Levels:

- | | |
|---|--|
| I) Standard | 150 N kg/ha 34-0-0 @ ZGS 22
150 N kg/ha 34-0-0 @ ZGS 30 |
| II) Additional N | 75 N kg/ha 34-0-0 @ ZGS 22
75 N kg/ha 34-0-0 @ ZGS 30
50 N kg/ha 34-0-0 @ ZGS 45 |
| III) Additional N
+ Fungicide | Treatment II plus
125 gai/ha Bayleton @ ZGS 30/31
125 gai/ha Tilt @ ZGS 45 and 60
1000 gai/ha Dithane @ ZGS 45 and 60 |
| IV) Additional N
+ Fungicide
+ P.G.R. | 1.5 L/ha Cycocel Extra @ ZGS 30 |

ANOVA TABLE FOR PARAMETERS MEASURED

	Winter Survival	Heads /m ²	Plant Height	Lodging Harvest	Mildew May 23	Mildew June 23	Septoria June 23
Management	N.S.	N.S.	**	N.S.	**	**	N.S.
Variety	**	N.S.	**	**	**	**	**
Management x Variety	N.S.	N.S.	N.S.	N.S.	**	**	N.S.
	Yield	Test Wt.		1000 K.Wt.			
Management	**	N.S.		**			
Variety	**	N.S.		**			
Management x Variety	N.S.	N.S.		**			

SIGNIFICANT MANAGEMENT LEVEL DIFFERENCES

Management Level	Plant Height (cm)	Mildew May 23	Mildew June 23	Yield (t/ha)
I	116.8 b	8.1 a	2.3 b	3.4 d
II	115.9 b	8.1 a	3.1 a	4.0 c
III	119.5 a	1.2 b	1.7 c	5.1 b
IV	101.4 c	.2 b	1.7 c	5.5 a
LSD	2.4	1.8	.5	.3

Management differences occurred in plant height (Treatment IV significantly less), Mildew May 23 (Treatment III & IV significantly less), Mildew June 23 (Treatment IV significantly less), and yield with treatment IV significantly out yielding the other treatments.

SIGNIFICANT VARIETAL DIFFERENCES (averaged over treatments)

Variety	Winter Survival	Plant Height (cm)	Lodging Harvest (0.2-9.0)	Yield (t/ha)
Absolvent	90.4 a	104.8 e	4.3 b	3.9 c
Borden	91.9 a	132.3 a	5.7 ab	5.1 a
Karat	81.7 b	118.2 b	4.6 ab	4.2 bc
Monopol	91.7 a	101.8 f	2.4 c	4.5 b
Perlo	79.6 b	114.3 c	5.5 ab	4.4 b
TW-1	93.3 a	109.3 d	5.9 a	5.1 a
LSD 0.05	5.4	2.9	1.4	.4

Significant varietal differences did occur. Karat and Perlo (81.7 and 79.6 respectively) were significantly lower in winter survival. (The winter survival in Truro, of Perlo for 87-88 was very low - 42.8%). Borden (132.3 cm) was significantly taller than the rest, while Absolvent (104.8 cm) the shortest. Lodging at harvest showed Monopol to be the most lodging resistant. Borden and TW-1 (5.1 t/ha) yielded significantly better than the rest with Absolvent the lowest yield of (3.9 t/ha).

SIGNIFICANT VARIETAL X MANAGEMENT INTERACTION

Management 1000 K.Wt.

Variety	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Absolvent	37.1	37.3	46.0	44.5
Borden	36.9	43.1	46.4	46.1
Karat	37.7	39.5	44.9	44.1
Monopol	41.5	39.6	44.8	42.9
Perlo	37.0	38.1	45.3	42.9
TW-1	37.2	41.6	45.3	43.9

There was significant varietal x management interaction in 1000 K.Wt. This indicates that the different varieties reacted differently to the management levels. Absolvent kernel size reacted most positively to the fungicide program.

<u>Variety</u>	<u>Management Level</u>			
	<u>Standard</u>	<u>Add N</u>	<u>Add N + F</u>	<u>Add N + Fung + PGR</u>
Absolvent	3.1	3.0	4.6	4.9
Borden	3.5	4.8	5.8	6.4
Karat	3.2	4.1	4.6	5.0
Monopol	3.6	3.5	5.0	5.7
Perlo	3.7	3.9	5.0	5.1
TW-1	3.4	5.0	5.9	6.0

All varieties responded positively to the fungicides program. Borden was the highest yielding variety followed closely by TW-1. Monopol was the best yielding milling quality wheat followed closely by Perlo.

FUSARIUM CONTROL ON CEREALS

Dwane Mellish,
Assistant Director

This trial evaluated the control of Fusarium head symptoms on spring wheat (Max) and spring Triticale (Beaguelita) by the 5 fungicides listed below. Three timings of application were used to see if a critical time of application for control could be determined.

Location:	Great Village	Co-operator:	Bob Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy Loam
Seeding Date:	Beaguelita -May 4 Max -April 30	Harvest Date:	Beaguelita -Sept.1 Max -Aug. 29
Plot Size:	2m x 6m	Experimental Design:	RCBD
Seed Rate:	400 seeds/m ²	Row Spacing:	15 cm
Fertilization:	Planting 400 kg/ha 17-17-17 ZGS 30 150 kg/ha 34-0-0		
Herbicide:	Refine @ 20 g/ha ZGS 23		
Insecticide:	Sevin XLR 3 L/ha - Aphid Control, July 26 (ZGS 70) Cygon .5 L/ha - Armyworm Control, July 7 (ZGS 60)		

<u>Treatment</u>	<u>Rate</u>	<u>Timing</u>
1. Benelate		Preflowering (3/4 head)
2. Bravo	2 kg ai/ha	Flowering
3. Folicur	125 gai/ha	Post Flowering
4. SAN619F	80 gai/ha	
5. Water		
6. SDS 66811/Bravo	100 gai/kg ai/ha	

Lodging in the Max was severe. Each variety was sprayed with the 6 treatments at the three different timings (as listed above).

Both varieties received a blanket application of Tilt (ZGS 39) for Septoria control.

Results:

Fusarium levels were very low in both the spring wheat and spring triticale. Head ratings indicated less than 2% incidence on all treatments. The fungicide treatments had no effect on fusarium head symptoms, test weight, kernel wt., or yield. Grain samples from this test will be analyzed for mycotoxins to see if the treatments had any effect on the toxins that may be produced by Fusarium.

SPRING CEREAL SEED TREATMENT EVALUATION

Dwane Mellish
Assistant Director

The first year of a 3 year study to evaluate the efficacy of various seed treatments for the control of several diseases on spring cereals, Cadette (barley) and Max (spring wheat).

Cadette and Max plots were alternated in the trial providing a guard plot between each variety.

The seed treatments and rates are listed in the results table.

No other disease control was applied other than seed treatment.

Location:	Great Village	Co-operator:	Bob Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy Loam
Seeding Date:	May 4	Harvest Date:	Cadette -Aug. 10 Max -Aug. 23
Plot Size:	1.25m x 6m	Experimental Design:	RCBD
Seed Rate:	400 seeds/m ²		
Row Spacing:	15 cm		
Fertilization:	Planting 400 kg/ha 17-17-17 ZGS30 150 kg/ha 34-0-0		
Herbicide:	Refine @ 20 g/ha ZGS 23		
Insecticide:	Sevin XLR 3 L/ha - Aphid Control, July 26 (ZGS 70) Cygon .5 L/ha - Armyworm control, July 7 (ZGS 60)		

SPRING WHEAT RESULTS

Treatment	Rate g a.i./ Kg Seed	Kernel Wt. (g/1000)	Test Wt. (kg/hl)	Yield (t/ha)	Mildew 2nd Leaf ZGS 49	Mildew 3rd Leaf ZGS 49	Mildew Head ZGS 75	Mildew Flag ZGS 75
Check	-	33.6 ab	73.2 ab	3.8 ab	0.4 bc	0.4 bc	0.5 b	.8 c
XE 779	1.5	34.5 ab	73.6 ab	3.6 ab	0.7 ab	1.2 bc	1.1 ab	2.2 ab
XE 779	3.0	33.4 ab	73.3 ab	3.5 ab	0.8 ab	1.4 b	1.5 a	2.6 a
TF 3770	0.05	34.8 a	73.4 ab	3.7 ab	0.1 c	0.3 c	0.6 b	0.8 c
TF 3770	.025	32.1 b	73.6 ab	3.5 ab	1.2 a	2.3 a	1.5 a	2.2 ab
TF 3480	0.3	33.7 ab	72.4 b	3.4 b	0.5 bc	0.9 bc	0.9 ab	1.2 bc
UBI2383	-	34.8 a	74.1 a	4.0 a	0.6 bc	0.8 bc	0.4 b	1.3 bc
Vitaflo 280	-	33.2 ab	73.3 ab	3.7 ab	0.4 bc	0.9 bc	0.7 b	1.6 abc
LSD (0.05)		2.3	1.4	.49	0.5	0.9	.6	1.1

Conclusions:

Mildew disease pressure was relatively low in this test and thus it was difficult to establish any significant disease control trends. No treatment gave an improvement in 1000 kwt, test wt. or grain yield. UBI 2383 had a significantly lower test wt. and grain yield from the check treatment.

SPRING BARLEY RESULTS

Treatment	Rate (g a.i./ kg seed)	Kernel Wt. (g/1000)	Test Wt. (kg/hl)	Yield (t/ha)	Blotch (%) 2nd Leaf ZGS 49	Blotch (%) 3rd Leaf ZGS 49	Scald (%) 2nd Leaf ZGS 49	Scald (%) 3rd Leaf ZGS 49
Check	-	44.3 ab	60.6 abc	5.4 a	0.8 b	1.1 b	0.0 b	0.13 c
XE 779	1.5	41.6 c	59.2 c	4.9 a	1.7 ab	2.2 ab	2.9 ab	3.6 bc
XE 779	3.0	42.9 abc	59.9 abc	5.6 a	1.7 ab	2.3 ab	3.3 ab	5.2 abc
TF 3770	0.05	44.3 ab	61.1 ab	5.7 a	0.6 b	1.2 b	0.0 b	0.0 c
TF 3770	0.025	40.4 c	59.0 c	5.2 a	2.3 a	3.0 a	7.3 a	6.7 ab
TF 3480	0.15	42.3 bc	59.8 bc	5.4 a	1.4 ab	2.0 ab	8.9 a	9.9 a
UBI 2383	0.30	45.4 a	61.5 a	5.9 a	0.8 b	1.3 b	0.0 b	0.0 c
Vitaflor 280	1.03	41.1 c	59.2 c	5.1 a	1.8 ab	2.6 a	5.8 ab	8.5 ab
LSO (0.05)		2.4	1.5	0.9	1.2	1.1	5.6	4.9

* Values in the same column which are followed by the same letter are not significantly different at the P = 0.05 level (Duncan's Multiple Range Test).

Conclusions:

Cadette is a semi dwarf, 6 row variety that is quite susceptible to scald. Scald was the predominant disease present. Lower levels of scald were recorded with the seed treatment of UBI 2383, TF 3770 (0.05 g a.i.) and the check, which was reflected in the thousand kernel weights and test weights. No observable differences in the emerged seedlings due to seed treatment were noted. A late blotch rating (ZGS 75) on the head showed no differences due to seed treatment in yields, yields ranged from a high of 5.9 t/ha (UBI 2383) to 4.9 t/ha (XE 779 @ 1.5 g a.i.). There were significant differences in thousand kernel weights with the order of treatments being the same except for XE 779 (1.5 g a.i.) and Vitaflor 280 being reversed. UBI 2383 gave the highest yield (not significant) and consistently out-performed other treatments for leaf disease and kernel characteristics, although not significantly in all parameters. The check and XE 3770 (0.05 g a.i.) were consistently lower than UBI 2383 over all the measured indicators, but were not always significantly different.

This project will be continued next year looking at the control of seedling and foliar diseases through seed treatment. In order to more accurately assess potential differences the number of replications in the tests may have to be increased.

SPRING WHEAT PRODUCTION MANAGEMENT TRIAL

Dwane Mellish
Assistant Director

This is an ongoing, five location, series of trials to assess the response of spring wheat to four levels of management. This project is partially funded by the Canada/Nova Scotia Agri-Food Agreement.

Location:	Great Village	Co-operator:	Robert Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy loam
Seeding Date:	April 29	Harvest Date:	August 28
Seed Rate:	400 seeds/m ²	Experimental Design:	Split Plot
Herbicide:	20 g/ha, Refine/ 20 ml/ha assist ZGS23		
Fertilizer:	Planting 400 kg/ha 17-17-17		
Insecticide:	Cygon 0.5 L/ha ZGS 60 (Armyworm Control) Sevin XLR 3 L/ha ZGS 70 (Aphid Control)		

Management Levels:

- I) Standard - 400 kg/ha 17-17-17 @ seeding
- II) Additional N - Management I plus - 150 kg/ha (50 kg/ha 34-0-0 @ ZGS30)
150 kg/ha (50 kg/ha 34-0-0 @ ZGS45)
- III) Additional N - Management II plus Tilt 125 gai/ha + Bravo 1 kg gai/ha
+ Fungicide @ ZGS39 and ZGS 55
- IV) Additional N - Management III plus Cerone 280 gai/ha @ ZGS39
+ Fungicide
+ PGR

ANOVA TABLE FOR MEASURED PARAMETERS

	Pop. /m ²	Head /m ²	Lodging (Harvest)	Yield	Test Wt.	1000 K.Wt.	Plant Height
Management	N.S.	N.S.	**	**	**	**	**
Variety	N.S.	**	**	**	**	**	**
Management x Variety	N.S.	N.S.	**	N.S.	**	**	N.S.

	Mildew July 6	Septoria Aug. 3	Mildew Aug. 3
Management	**	**	**
Variety	**	**	**
Management x Variety	**	N.S.	**

YIELD (t/ha)

Variety	Management			
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Belvedere	5.4	5.3	5.9	6.9
James	4.4	3.5	4.6	5.1
Katepwa	3.9	3.5	3.9	4.6
Len	3.7	3.6	4.8	4.9
Max	5.2	4.3	5.5	5.7
Nordic	4.3	3.6	5.1	5.5
Norseman	4.6	3.8	5.0	5.4

The interaction of management and variety was significant in lodging, test wt., 1000 k.wt., early mildew and late mildew. This interaction indicates that the varieties reacted differently to the management levels.

Belvedere was the highest yielding variety (5.9 t/ha), Max next (5.2 t/ha), with Len and Katepwa (4.3 t/ha) the lowest. The additional N treatment (3.9 t/ha) significantly reduced yields over the standard (4.5 t/ha). The fungicide application (5.0 t/ha) significantly increased yields over management I and II with the P.G.R. application (5.4 t/ha) significantly outyielded all the other managements.

Significant reduction in 1000 k.wt. occurred with the addition of N the Standard fungicide and P.G.R. treatments were similar.

Lodging was significantly increased with the additional N treatment.

Belvedere is a feed wheat while Max and Katepwa are milling wheats. The remaining varieties are U.S. varieties that are not presently registered for use in Canada.

SPRING CEREAL BROADCAST VS. DRILL DEMONSTRATION

Eric Bosveld
Soil and Crop Specialist

There are certain advantages and disadvantages to both broadcasting and drilling as methods of seeding spring cereals. Broadcasting is normally quicker whereas drilling often gives better control of rate, seed distribution and depth and does not require an additional pass for incorporation. However, when seed distribution and depth are carefully controlled with broadcast methods, interplant competition theoretically should be reduced. Leger barley was used to set up a demonstration at Willis Cock's in Waldegrave, N.S. to evaluate the time requirement for each seeding method and to determine whether there were differences in yield. Autumn conditions necessitated spring plowing of a portion of the field which was conveniently included as a treatment.

Treatments

1. Spring plowed, broadcast
2. Fall plowed, broadcast
3. Fall plowed, drilled

The co-operator used a spinner type spreader that distributed the seed over a 15 meter width, which necessitated a 10 meter spacing to give a 33% overlap. A light harrowing was used to incorporate the seed following the broadcasting operator. A disk opener grain drill was used for comparison.

Operational seeding time was measured by two methods. The first was actual seeding time for each method which allowed for turning at the end of the field and filling time, therefore it is specific to this demonstration. The second method eliminated turning and filling time to improve applicability to other field sizes and shapes. Two stakes placed at a known distance apart were used to measure ground speed of the drilling, broadcasting and harrowing operations. For simplicity this will be termed as the theoretical seeding time.

Operational Time

Broadcast

actual harrow	2.7 ha/hour	or	22 min/ha
actual broadcast	2.6 ha/hour	or	23 min/ha
Total (actual)			45 min/ha
theoretical harrow	3.2 ha/hour	or	19 min/ha
theoretical broadcast	7.5 ha/hour	or	8 min/ha
Total (theoretical)			27 min/ha

Drill

actual	1.1 ha/hour	or	55 min/ha
theoretical	1.5 ha/hour	or	40 min/ha

There was a dramatic difference in actual and theoretical seeding times for both methods as would be expected, however the difference was more pronounced with the broadcast seeding method. The majority of this difference came from the filling time required and not the turning time at the end of the field as indicated by the harrowing and broadcasting theoretical times.

Plant populations of the treatments were also evaluated, however they were taken too late to determine the percentage of tillering. Ten 1/10 meter counts were made per plot on July 19th.

Treatment	Seeding Rate (kg/ha)	Population (Plants/m ²)	Range (Plants/m ²)
1. Broadcast Spring plowed	138	279	160 - 400
2. Broadcast Fall plowed	138	398	240 - 680
3. Drilled	119	293	220 - 340

The variation in plant population was much higher with the broadcasting method in fact the average population in treatment 2 was distorted somewhat by three sample counts with exceptionally high populations.

Yields were determined by weighing the grain produced on each plot with the highway scale and dividing by the total area with the following results:

Treatment	Yield (kg/ha)	% C.P.	% T.D.N.
1. Broadcast Spring plowed	1961	10.4	74.6
2. Broadcast Fall plowed	2086	10.4	73.7
3. Drilled	2164	10.1	73.4

The highest yielding treatment was the drilled method and the lowest was the spring plowed, broadcast seeding. However, the difference between these treatments was only 200 kg/ha which would undoubtedly be insufficient to be deemed significant. It becomes apparent that a controlled, replicated experiment would be necessary to fully evaluate potential yield differences between these methods of seeding. However, in the context of this demonstration, there seems to be no substantial difference in yield and seeding time can be reduced to half with the broadcast method if an additional tractor and operator are available.

BARLEY PRODUCTION MANAGEMENT TRIALS

Dwane Mellish
Assistant Director

This trial is one of an ongoing series of trials (7 locations in N.S., P.E.I. and N.B.) to assess the response of 2-row and 6-row barley varieties to four levels of management. This program is partially funded by the Canada/Nova Scotia Agri-Food Agreement.

Location:	Great Village	Co-operator:	Robert Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy Loam
Seeding Date:	April 28	Experimental Design:	Split Plot
Plot Size:	1.25m x 6m	Harvest Date:	2-row Aug. 9 6-row Aug. 10
Herbicide:	Refine 20 g/ha ZGS 23		
Insecticide:	Sevin 3 L/ha ZGS 70 - Aphids Cygon 5 L/ha ZGS 60 - Armyworm		
Fertilization:	Planting 400 kg/ha 17-17-17 Additional N according to protocol		
Varieties:	2-row AB93-2, AB94-11, Albany, Helena, Micmac, Morrison, Simcoe, Rodeo, Winthrop, TBR579-5 6-row Cadette, Chapais, Duke, Etienne, Maskot, Sabina, Leger, OAC Kippen, Samson, Tupper		

Management Levels:

- I) Standard - No additional treatments
- II) Additional N - Management I plus 150 kg/ha 34-0-0
- III) Additional N - Management II plus Tilt 125 gai/ha
+ Fungicide @ ZGS 39 and ZGS 50
- IV) Additional N - Management III plus
+ Fungicide Cerone 300 gai/ha
+ P.G.R. @ ZGS 39/40

Yield levels for both 2-row and 6-row barleys were generally high in a relatively good growing season.

2-ROW BARLEY - ANOVA TABLE

	Plants /m ²	Plant Height (cm)	Lodging Harvest	Head Date	Ripe Date	Blotch Head (ZGS 55)	Scald (ZGS 55)
Management	N.S.	**	**	**	N.S.	**	*
Variety	**	**	**	**	**	**	**
Variety x Management	N.S.	N.S.	**	**	N.S.	**	N.S.

	Yield	1000 K.Wt.	Test Wt. (kg/hl)
Management	**	**	**
Variety	**	**	**
Variety x Management	N.S.	**	**

Results

Lodging pressure was high and some of the lodging was related to disease pressure, since the fungicide program significantly reduced lodging.

GRAIN YIELD (t/ha)

	I Standard	II Add. N	III Add. N + Fung.	IV Add. N + F + P.G.R.
AB93-2	5.9	6.2	6.7	6.6
AB94-11	5.5	5.1	6.9	5.9
Albany	5.3	5.2	6.5	5.9
Helena	5.8	5.9	6.6	5.7
Micmac	5.4	5.3	6.4	6.3
Morrison	6.0	6.6	7.1	6.3
Simcoe	5.4	5.7	6.6	5.8
Rodeo	5.4	5.3	6.6	5.7
Winthrop	5.5	5.5	7.0	6.8
TBR579-5	5.9	6.1	7.0	5.7

LODGING HARVEST (0.2-9.0)

AB93-2	3.7	4.8	2.8	.2
AB94-11	4.9	5.7	4.0	.2
Albany	5.1	5.4	5.2	.3
Helena	3.4	5.0	2.3	.2
Micmac	4.6	5.3	5.3	.2
Morrison	3.8	4.5	1.0	.2
Simcoe	4.5	5.2	3.9	.2
Rodeo	4.4	5.2	3.5	.2
Winthrop	4.8	5.1	4.1	.2
TBR579-5	4.1	4.8	3.4	.2

Additional N

Yields for AB94-11 was reduced by .5 t/ha over the Standard Management, Albany, Micmac and Rodeo were only slightly reduced, while the other 6 varieties increased yields by as much as .6 t/ha (Morrison). With the exception of Morrison, which remained the same, all varieties had reduced 1000 k.wt. by an average of 1 gram. Lodging was increased by approximately 10% in most varieties over the standard treatment, AB93-2 only slightly.

Additional N + Fungicide

The addition of fungicide to the Additional N treatment increased all yields, AB94-2 increased by 1.9 t/ha, while Albany, Micmac, Rodeo and Winthrop were increased by over 1 t/ha. All 1000 k.wt. were raised by as much as 6.2 g (Albany), 5.4 g (AB94-2 and Helena), and 5.3 g (Simcoe). Lodging was reduced in 9 varieties; with Morrison reduced by 78% over the Additional N treatment, Albany only marginally and Micmac remained the same.

P.G.R.

The addition of Cerone to treatment III decreased all yields compared to treatment III. TBR579-5 was reduced the most -1.4 t/ha with AB94-2, Helena and Rodeo having reduced yields of approximately 1.0 t/ha. Lodging for all varieties was reduced to near zero. Micmac and Winthrop increased 1000 k.wt. by 2.4 and 2.0 g respectively, while all other varieties had reduced 1000 k.wt. by as much as 6.9 g (Simcoe) and 5.4 g (Helena).

General

The Additional N and fungicide treatment significantly outyielded the other three treatments while treatment 4 significantly outyielded treatments 1 and 2.

The various degree of sensitivity to Cerone among the 2-rows can be seen from the general yield reduction of treatment 4 over treatment 3. Plant shortening in this trial would seem to have been excessive.

The newly registered variety Morrison performed well in this trial as well as several other varieties. Most varieties outyielded Rodeo, the check variety.

6-ROW BARLEY - ANOVA TABLE

	Population /m ²	Plant Height	Head Date	Lodging Harvest	Plotch July 5	Scald July 5
Management	N.S.	**	N.S.	**	N.S.	N.S.
Variety	**	**	**	**	**	**
Management x Variety	N.S.	N.S.	*	**	N.S.	N.S.
	Yield	1000 k.wt.	Test Wt.			
Management	**	**	**			
Variety	**	**	**			
Management x Variety	N.S.	*	**			

6-ROW BARLEY - GRAIN YIELD (t/ha)

Management

	I	II	III	IV
	<u>Standard</u>	<u>Standard + Additional N</u>	<u>Add N + Fung.</u>	<u>Add N + Fung. + P.G.R.</u>
Cadette	5.8	6.2	6.9	7.0
Chapais	6.4	6.3	7.3	7.6
Duke	5.9	6.8	6.7	7.5
Etienne	6.0	6.4	6.6	6.9
Maskot	5.6	6.0	6.1	7.3
Sabina	5.7	6.0	6.8	7.3
Leger	5.9	6.2	6.3	6.9
OAC Kippen	5.5	5.6	6.0	6.5
Samson	6.0	5.9	5.7	6.9
Tupper	4.3	4.1	4.4	5.4

LODGING (0.2-9.0 Belgium Scale)

Cadette	2.4	1.5	1.5	.3
Chapais	2.7	6.4	4.2	2.2
Duke	4.7	5.2	1.7	.2
Etienne	1.0	4.2	5.1	1.0
Maskot	1.2	2.8	3.3	.7
Sabina	1.1	3.9	3.5	1.4
Leger	3.2	5.6	5.8	2.5
OAC Kippen	3.4	6.5	5.8	3.1
Samson	4.1	5.6	5.6	1.4
Tupper	3.7	5.9	5.7	2.8

Additional N

The addition of extra nitrogen reduced yields slightly for Chapais, Samson and Tupper, while increasing yields for the other varieties with Duke yielding .9 t/ha more than the standard treatment.

With the exception of Cadette, all varieties had increased lodging approximately twice the standard treatment.

1000 k.wt. was marginally increased in Maskot with the other 9 varieties having decreased weights.

Additional N + Fungicide

Addition of fungicide to treatment 2 increased yields in 4 varieties (Sabina .8 t/ha) and did not significantly effect the other 6 varieties.

The fungicide reduced lodging in Chapais, Duke and OAC Kippen. Etienne had a slightly higher lodging score and the remaining varieties were unaffected.

Lodging increased with Etienne, Maskot and Leger; remained the same for Cadette and Samson, and decreased with Duke (-78%), Chapais, Sabina, OAC Kippen and Tupper. All 1000 k.wt. were improved with Cadette displaying the largest increase of 5.2 grams.

P.G.R.

All yields increased with the use of a PGR, Maskot and Samson increased by 1.2 t/ha, Tupper 1.0 t/ha and Duke .8 t/ha.

Lodging was reduced in all varieties by as much as 4.2 (Samson) and 4.1 (Etienne) on the Belgium Scale (0.2-9.0). The addition of a PGR continued the trend of increased 1000 k.wt., with the exception of Duke which had a slight decrease of .2 grams.

General

Duke and Maskot exhibited the strongest straw strength of all varieties. Lodging was a limiting factor for most varieties. Disease pressure in this trial was a significant yield factor for Cadette, Chapais and Sabina. Tupper yielded less than the other varieties but it represents the better hulless barley varieties.

Cost of production figures were used to calculate the cost/tonne of grain produced under the four management systems. Variable costs were calculated to be \$393.68/ha, including costs for production, harvesting and cost overhead based on Farm Management Factsheet 1988-104. It is assumed barley was grown on a farm with more than the barley enterprise sharing the fixed cost. A fixed cost of \$130.62 is used. A straw credit of \$50/ha is deducted from the total cost. The base cost of production is $(\$393.68 + \$130.62 - \$50)$ \$474.30. The additional inputs of nitrogen, fungicide and growth regulator are charged at cost.

2-ROW BARLEY COST OF PRODUCTION

Variety	Standard (\$474.30/ha)		Add N (\$524.00/ha)		Add N + F (\$594.20/ha)		Add N + F + PGR (\$627.95/ha)	
	Yield	\$/t	Yield	\$/t	Yield	\$/t	Yield	\$/t
AB93-2	5.9	80	6.2	85	6.7	89	6.6	95
AB94-11	5.5	86	5.1	103	6.9	86	5.9	106
Albany	5.3	90	5.2	101	6.5	91	5.9	106
Helena	5.8	82	5.9	89	6.6	90	5.7	110
Micmac	5.4	88	5.3	99	6.4	93	6.3	100
Morrison	6.0	79	6.6	79	7.1	84	6.3	100
Simcoe	5.4	88	5.7	92	6.6	90	5.8	108
Rodeo	5.4	88	5.3	99	6.6	90	5.7	110
Winthrop	5.5	86	5.5	95	7.0	85	6.8	93
TBR579-5	5.9	80	6.1	86	7.0	85	5.7	110

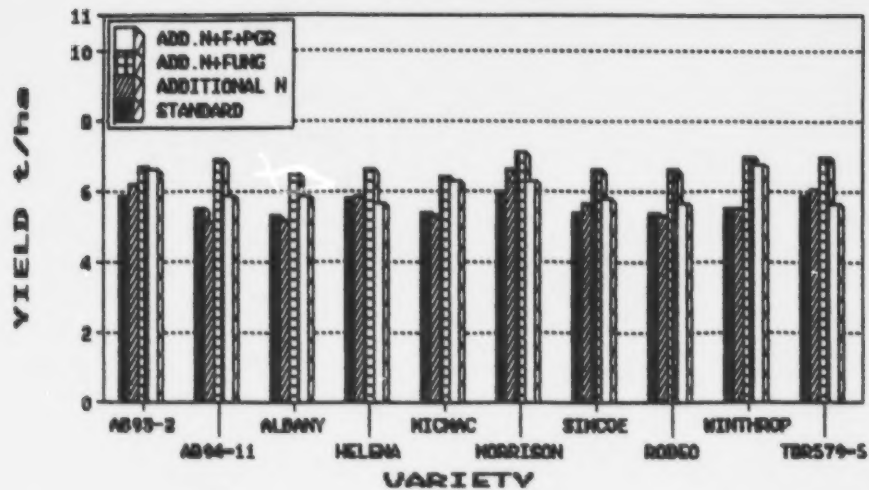
6-ROW BARLEY COST OF PRODUCTION

Cadette	5.8	82	6.2	85	6.9	86	7.0	90
Chapais	6.4	74	6.3	83	7.3	81	7.6	83
Duke	5.9	80	6.8	77	6.7	89	7.5	84
Etienne	6.0	79	6.4	82	6.6	90	6.9	91
Maskot	5.6	85	6.0	87	6.1	97	7.3	86
Sabina	5.7	83	6.0	87	6.8	87	7.3	86
Leger	5.9	80	6.2	85	6.3	94	6.9	91
OAC Kippen	5.5	86	5.6	94	6.0	99	6.5	97
Samson	6.0	79	5.9	89	5.7	104	6.9	91
Tupper	4.3	110	4.1	128	4.4	135	5.4	116

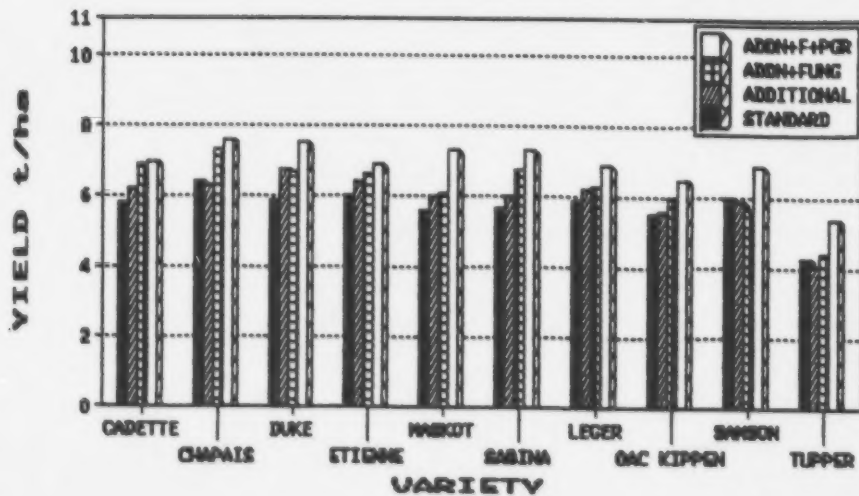
The cost production of varieties varied with the management input, however even with a significant increase in variable inputs in some cases the cost of production per tonne stayed very close to the cost/tonne at the standard treatment level. The amount of grain produced should also be considered. A producer growing 50 ha of Chapais barley under the standard treatment (6.4 t/ha) would harvest 320 tonnes of barley, while under the fungicide treatment (7.3 t/ha) 365 tonnes would be harvested. The cost of the fungicide treatment is higher than usual because 2 applications of Tilt fungicide were used to ensure complete disease control even on the most susceptible varieties, normally only one application would be required.

The \$/tonne comparison indicates the relative performance of the varieties under the 1989 growing conditions at the Great Village location only.

2 ROW BARLEY PRODUCTION MANAGEMENT TRIAL



SIX ROW BARLEY PRODUCTION MANAGEMENT TRIAL



DISEASE CONTROL ON SPRING WHEAT

Dwane Mellish
Assistant Director

This trial funded by ALFI Technology Development program was conducted on Max spring wheat to determine responses from altering timing of fungicides to control Septoria on grain yield and quality.

Location:	Great Village	Co-operator:	Bob Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy Loam
Seeding Date:	April 30	Harvest Date:	Max - Aug. 29
Plot Size:	1.25m x 6m	Experimental Design:	RCBD
Seed Rate:	400 seeds/m ²	Row Spacing:	15 cm
Fertilization:	Planting 400 kg/ha 17-17-17 ZGS 30 150 kg/ha 34-0-0		
Herbicide:	Refine @ 20 g/ha ZGS 23		
Insecticide:	Sevin XLR 3 l/ha - Aphid Control, July 26 (ZGS 70) Cygon .5 L/ha - Armyworm Control, July 7 (ZGS 60)		

SIGNIFICANT TREATMENT DIFFERENCES

Treatment	Rate (g a.i./ha)	Application (ZGS)	Septoria Flag ZGS75 (%)	Mildew Flag ZGS75 (%)	Yield (t/ha)
Check	-	-	9.3 abc	5.1 abc	3.8 ef
Tilt	125	31	12.1 ab	5.4 ab	3.7 f
Tilt	125	39	8.8 abc	4.4 abcd	4.2 abcdef
Tilt	125	57	6.9 abc	3.1 cdefg	4.3 abcdef
Tilt/Bravo	125/1000	31	7.7 abc	5.0 abc	3.9 def
Tilt/Bravo	125/1000	39	7.2 abc	3.4 bcdef	4.4 abcde
Tilt/Bravo	125/1000	57	4.4 c	1.9 efgh	4.4 abcdef
Tilt/Dithane	125/1760	31	9.5 abc	5.5 ab	4.2 abcdef
Tilt/Dithane	125/1760	37	6.6 bc	2.1 efgh	3.9 cdef
Tilt/Dithane	125/1760	57	6.6 bc	1.9 efgh	3.9 def
Tilt	125	31 + 57	7.1 abc	2.7 defgh	4.3 abcdef
Tilt + Tilt/ Bravo	125 + 125/ 1000	31 + 57	4.6 c	3.9 abcde	4.7 ab
Tilt + Tilt/ Dithane	1760	31 + 57	4.0 c	2.0 efgh	4.7 abc
Tilt	125	39 + 57	3.9 c	.5 h	4.6 abcd
Tilt/Bravo	125 + 1000	39 + 57	3.8 c	.9 gh	4.5 abcde
Tilt/Dithane	125 + 1000	39 + 57	3.2 c	1.2 fgh	4.9 a
Bravo	1000	39 + 57	6.6 c	5.5 ab	4.4 abcdef
Dithane	1760	39 + 57	13.8 a	6.0 a	4.0 bcdef
Folicure	125	31	9.3 abc	3.1 cdefg	4.0 cdef
Folicure	125	39	7.6 abc	2.5 defgh	4.6 abcd
Folicure	125	57	9.2 abc	2.7 defgh	4.2 bcdef
Tilt + Tilt/ Bravo/Benelate	125 + 125/ 1000/250	31 + 57	4.9 c	2.9 cdefg	4.6 abcd
LSD (0.05)			5.8	1.9	.6

Lodging was severe in this trial. Much of the trial was badly lodged shortly after heading, which reduced the potential effectiveness of the treatments. Mildew was present in low levels and septoria pressure was moderate.

The best disease control and yield response occurred in the treatments which had an application at ZGS 57. The benefit of this application at heading time is consistent with previous trials. Properly timed fungicide applications can result in a tonne/ha yield increase.

This project will continue next year.

FOLIAR FUNGICIDES ON SPRING WHEAT & BARLEY

Dwane Mellish
Assistant Director

This was the second year of a series of trials to evaluate the new experimental compounds for control of foliar diseases in cereals. The trial was conducted on a spring wheat (Max) and barley (Cadette). Treatment comparisons for the wheat and barley differed and are listed below in the tables. Both received fungicide applications twice, once at ZGS 37 and once at ZGS 55.

Location:	Great Village	Co-operator:	Bob Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy Loam
Seeding Date:	April 30	Harvest Date:	Aug. 10
Seeding Rate:	400 seeds/m ²	Experimental Design:	RCBD
Plot Size:	2m x 6m	Harvest Plot Size:	1.25m x 6m
Fertilization:	400 kg/ha 17-17-17 Planting 150 kg/ha 34-0-0 ZGS 30/31		
Herbicide:	Refine 20 g/ha/200 ml/ha Assist ZGS 23		
Pesticides:	Cygon .5 l/ha aphid control Sevin LRX Plus 3 l/ha - Armyworm control		

Spring Barley (Cadette)

<u>Treatment</u>	<u>Rate (g a.i./ha)</u>
Check	-
SAN619F	40
SAN619F	60
SAN619F	80
SAN619F	100
Tilt	125
Bayleton	125
Folicur	125

ANOVA TABLE FOR MEASURED PARAMETERS

	Blotch 2nd Leaf ZGS 45	Blotch 3rd Leaf ZGS 45	Scald 2nd Leaf ZGS 45	Scald 3rd Leaf ZGS 45	Blotch Head ZGS 75	Blotch Flag ZGS 75	Scald Flag ZGS 75
Treatment	N.S.	N.S.	**	*	N.S.	*	N.S.
	Yield	1000 k.wt.	Test Wt.				
Treatment	N.S.	**	**				

Means for Selected Parameters

Treatment	Rate g a.i./ha	Scald 2nd Leaf ZGS 45	Blotch Flag ZGS 75	1000 k.wt. (g)	Test Wt. (kg/ha)	Yield (t/ha)
Check	-	5.4 a	5.4 a	43.7 b	62.6 c	6.6
SAN619F	40	2.0 b	3.4 b	46.3 a	65.5 ab	6.8
SAN619F	60	1.0 b	2.9 b	47.6 a	64.4 ab	6.9
SAN619F	80	0.3 b	2.7 b	47.1 a	65.8 a	6.9
SAN619F	100	0.4 b	3.3 b	48.2 a	65.0 ab	6.8
Tilt	125	1.6 b	2.9 b	46.4 a	64.3 b	6.7
Bayleton	125	1.4 b	3.1 b	46.6 a	65.0 ab	6.8
Folicur	125	1.3 b	3.2 b	47.3 a	65.5 ab	6.8
LSD		2.4	1.5	1.7	1.3	N.S.

Grain yields were very high irregardless of treatment applied and no significant yield response occurred due to fungicide treatment.

The check consistently showed significantly higher disease ratings and lower 1000 k.wt. and test wt.

The experimental compound SAN619F concentration of 80 g a.i./ha consistently produced the lowest disease ratings but not significantly different from all treatments, as well as a very good test wt. Folicur, also an experimental compound gave excellent disease control and test wt.

SPRING WHEAT

ANOVA TABLE FOR MEASURED PARAMETERS

	Septoria 3rd Leaf ZGS 45	Septoria 2nd Leaf ZGS 45	Mildew 2nd Leaf ZGS 45	Mildew 3rd Leaf ZGS 45
Treatment	N.S.	N.S.	**	**
	Septoria Head ZGS 75	Septoria Flag Leaf ZGS 75	Mildew Flag ZGS 75	Mildew Head ZGS 75
Treatment	N.S.	**	**	**
	1000 k.wt.	Test Wt.	Yield	
Treatment	**	**	*	

Spring Wheat

Treatments	Rate (g a.i./ha)
Check	-
SAN619F	40
SAN619F	60
SAN619F	80
SAN619F	100
Tilt	125
Folicur	125
Folicur + Dithane	125 + 2.25 kg/ha
Folicur + Bravo	125 + 2 L/ha
Folicur + Polyram	125 +

Means for Selected Parameters

Treatment	Mildew 2nd Leaf ZGS 45	Septoria Flag ZGS 75	Mildew Flag ZGS 75	1000 kwt. (g)	Test Wt kg/hl	Yield kg/ha
Check	1.7 a	8.5 a	3.3 a	32.4 b	69.5 b	3.6 b
SAN619F	.4 cd	4.4 bc	.5 b	37.3 a	74.9 a	4.5 a
SAN619F	.2 d	5.7 b	.4 b	36.4 a	74.1 a	4.4 ab
SAN619F	.5 bcd	4.4 bc	.4 b	37.4 a	74.2 a	4.4 ab
SAN619F	.3 d	5.2 bc	.4 b	37.1 a	74.0 a	4.6 a
Tilt	1.4 abc	3.6 bc	.8 b	37.7 a	73.6 a	4.2 ab
Folicur	1.0 abcd	5.2 bc	1.0 b	37.8 a	74.5 a	4.5 a
Folicur + Dithane	1.2 abcd	2.7 c	.7 b	38.0 a	75.3 a	4.8 a
Folicur + Bravo	1.0 abcd	3.4 bc	.6 b	37.7 a	74.3 a	4.5 a
Folicur + Polyram	1.5 ab	3.3 bc	.6 b	37.6 a	74.8 a	4.8 a
LSD	.9	2.2	.9	2.4	2.7	.8

This spring wheat test was badly lodged shortly after heading which resulted in a reduced grain yield. This also made the evaluation of treatment responses less accurate.

All fungicide combinations reduced septoria levels over the check treatment. As well the treatments also reduced mildew at the later stages of growth. All fungicide treatments improved 1000 k.wt., test wt. and grain yield but no significant differences existed between fungicide treatments.

MAX/KATEPWA MANAGEMENT COMPARISON

Dwane Mellish
Assistant Director

To compare the response of two spring wheat varieties, Max and Katepwa, to fungicide and P.G.R. management. The trials were designed to look at each variety separately and combined. To date Max is the prominent spring wheat being grown in Nova Scotia for milling purposes, while Katepwa a western wheat has been used in other parts of the Region.

Location:	Great Village	Co-operator:	Robert Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy Loam
Seeding Date:	April 30	Harvest Date:	
Seeding Rate:	400 seeds/m ²	Experimental Design:	Split Plot
Plot Size:	1.25m x 6m		
Herbicide:	Pefine @ 20 gal/ha + Assist @ 200 ml/ha		
Fertilization:	400 kg/ha 17-17-17 @ planting		
	150 kg/ha 34-0-0 @ ZGS 30		
	150 kg/ha 34-0-0 @ ZGS 45		

Treatments:

Fungicide	1) None
	2) Tilt 125 gal/ha + Dithane M45 1.0 kg ai ZGS 39 & ZGS 55
P.G.R.	1) CCC 0.3 L/ha product @ ZGS 30/31
	2) Cerone 0.5 L/ha product @ ZGS 39/45
	3) Terpal C 0.3 CCC x 0.5 L Cerone @ ZGS 37
	4) None

MAX ANOVA TABLE

	Septoria 3rd Leaf ZGS 45	Mildew 2nd Leaf ZGS 45	Mildew 3rd Leaf ZGS 45	Septoria Head ZGS 75	Septoria Flag ZGS 75	Mildew Head ZGS 75
Fung.	N.S.	*	*	**	**	**
P.G.R.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Fung. + PGR	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
	Mildew Flag ZGS 75	Plant Height	Lodging Harvest	Test Wt.	1000 K.Wt.	Yield
Fung.	**	N.S.	N.S.	N.S.	*	*
P.G.R.	N.S.	**	**	N.S.	*	**
Fung. + PGR	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

SIGNIFICANT PARAMETER DIFFERENCES

	Mildew 2nd Leaf ZGS 45	Mildew 3rd Leaf ZGS 45	Septoria Head ZGS 75	Septoria Flag ZGS 75	Mildew Head ZGS 75	Mildew Flag ZGS 75
Fung.	.05 b	.2 b	2.0 b	2.0 b	.06 b	.2 b
No. Fung.	1.1 a	2.1 a	6.5 a	12.8 a	2.2 a	5.1 a
LSD	.2	.4	.9	1.9	.3	.8

	1000 k.wt.	Yield
Fung.	32.4 b	6.2 b
No. Fung.	37.5 a	4.9 b
LSD	.9	.3

	Plant Height (cm)	Lodging Harvest	1000 K.Wt.	Yield (t/ha)
CCC	99 b	.2 b	34.1 b	6.1 a
Cerone	107 a	4.8 a	36.0 a	5.3 b
Terpal C	96.5 b	.6 b	34.1 b	6.0 a
No PGR	107.5 a	5.8 a	35.6 a	4.9 b
LSD	3.6	2.0	1.3	.5

The fungicide application significantly reduced mildew (2nd leaf ZGS 45, 3rd Leaf ZGS 45, flag ZGS 75, head ZGS 75, flag leaf ZGS 75), Septoria (head ZGS 75).

Significant increases in 1000 k.wt. and yield (6.2 t/ha fungicide/4.9 t/ha no fungicide) were produced with the fungicide application.

The application of CCC and Terpal C significantly reduced 1000 k.wt., plant height and lodging and significantly increased yield. The response to the P.G.R. was directly related to the P.G.R. treatment since the non-treated plots had a very high rate of lodging.

The Cerone treatment was ineffective in either shortening the crop or reducing the lodging. In previous trials Cerone was very effective and its lack of performance is unexplainable and can only be attributed to application error of some nature.

KATEPWA ANOVA TABLE

	Septoria 1st Leaf ZGS 45 (%)	Mildew Flag ZGS 45 (%)	Mildew 1st Leaf ZGS 45 (%)	Septoria Head ZGS 75 (%)	Mildew Head ZGS 75 (%)
Fung.	N.S.	*	*	**	*
P.G.R.	N.S.	N.S.	N.S.	*	N.S.
Fung. + P.G.R.	*	N.S.	N.S.	N.S.	N.S.
	Plant Height	Lodging Harvest	Test Wt.	1000 K.Wt.	Yield
Fung.	*	N.S.	**	**	*
P.G.R.	*	**	*	N.S.	**
Fung. + PGR	N.S.	**	N.S.	N.S.	N.S.

SIGNIFICANT PARAMETER DIFFERENCES

	Mildew Flag ZGS 45 (%)	Mildew 1st Leaf ZGS 45 (%)	Septoria Head ZGS 75 (%)	Mildew Head ZGS 75 (%)
Fung.	1.2 b	2.7 b	1.6 b	.1 b
No. Fung.	8.0 a	12.6 a	11.4 a	3.3 a
LSD	.8	2.3	1.3	.9
	Test Wt. (kg/hl)	1000 K.Wt. (g)	Yield (kg/hl)	
Fung.	73.8 a	34.7 a	4.1 b	
No. Fung.	70.7 b	30.1 b	3.2 b	
LSD	1.3	1.0	.2	

LODGING AT HARVEST

	Fung.	No. Fung.		
CCC	3.3	6.1		
Cerone	4.8	4.8		
Terpal C	1.2	4.8		
None	4.3	5.0		
	Septoria Head ZGS 75 (%)	Plant Height (cm)	Test Wt. (kg/hl)	Yield (t/ha)
CCC	6.4 b	106.8 b	72.9 a	3.8 a
Cerone	5.4 b	113.0 a	70.7 b	3.5 b
Terpal C	5.6 b	105.3 b	73.1 a	4.0 a
None	8.4 a	112.0 a	72.2 ab	3.4 b

The fungicide application significantly reduced Mildew (flag leaf ZGS 45, 1st leaf ZGS 45, head ZGS 75) and Septoria (head ZGS 75). Significant increases in test wt., 1000 k.wt and yields (fungicide 4.1 t/ha / no fungicide 3.2 t/ha) were produced due to the fungicide application.

The PGR applications of CCC and Terpal C significantly increased yield, test wt. and significantly reduced plant height. As in the Max, Cerone was in effect, which can only be attributed to an application error.

General

Lodging was high where there was no PGR used. The fungicide significantly reduced lodging in the Katepwa, which had a very high disease level. This was not the case with Max. Significant yield responses were obtained from the control of lodging. Head fusarium symptoms were not obvious in this trial. Max significantly outyielded Katepwa at all treatments.

CEREAL MANAGEMENT CENTRE
ALFI PROJECT TT-22

J.E. Peill
Lyndhurst Farms Ltd.

Second Year Progress Report on Project TT-22

This project involves the acquisition, operation and monitoring of:

- one ICM 18-meter sprayer
- one matching bowser
- one ICM fertilizer spreader, 18-meter

The principle supported in the first year progress report still applies. The following report deals with the additional observations and experienced gathered in the second year.

18-Meter Hardi Sprayer ICM Special

This machine covered about 2200 hectares with various fungicides, insecticide and herbicide sprays during the 1989 growing season.

Calibration and accuracy was very good, plus/minus 5% of targeted rates on average. The machine was put through operation spraycheck in the spring of 1989 where it performed with a 98% accuracy.

As opposed to the previous year, only 110⁰ flat fan nozzles were used. Hardi 4110-12, 4110-20 and 4110-30 achieved application rates from 75 to 450 litres per hectare, in coarse, medium and fine droplet sizes. Pressures and nozzles were selected, depending on the material applied and the crop size and the wind conditions.

The machine disappointed in the amount of repairs required this year. The pump needed frequent servicing, twice rebuilding and will likely have to be completely replaced with a new pump for \$1900 this fall. Perhaps this is the expected life of the pump; after all, the machine did spray some 4400 ha. There is a possibility that the initial use of common grade ammonium sulphate hastened the wear on the pump. We changed to chemical pure grade as soon as the problem was noticed.

In addition, the P.T.O. assembly required a lot of attention; two full replacements, and rewelding of support frame.

The boom assembly also cracked in many places, and need reinforcement and a lot of welding work.

Including the new pump, we estimate that repairs on the machine will require about \$4,400 this year. That works out to about a maintenance cost of \$1 per hectare sprayed so far.

Operation and repairs will be carefully monitored during the coming season, with the aim to pin down the annual maintenance cost.

Overum Tive Fertilizer Spreader 4018

This machine treated approximately 1200 hectares during the season. It performed excellently in all respects, as well as in year one. It did not require any special repairs during the season. To prevent spread of rust, however, the machine will require sand blasting and painting this winter. We estimate the cost to be in the \$1500 to \$2000 range.

We did find that static calibration was no longer accurate due to wear on the metering wheel. Rather than replacing the wheel at this time, we chose to go for mobile calibration, i.e. a 28-meter drive test strip. The benefit of this approach is that no matter what the wear, the test yields of a true reflection of the rates that will actually be applied and is self adjusting.

The 4018 proved again to be a well-engineered service and operator-friendly machine.

Water Bowser

Also the water bowser gave trouble-free efficient service during the entire 1989 season.

Upgrading during the preceding winter months involved the installation of agitation lines in the mixing tanks. The agitation lines consisted of PVC pipe with strategically placed holes which would provide pressurized agitation and washing of the interior walls of the tank. Pre-mixing, transfer and refilling operations worked trouble-free, and saved a lot of down time for the sprayer, as well as sprayer time travelling from the water source to the field.

In summary, while the repair costs for the sprayer are disappointing, the three machines work well as a team in the maintenance of cereal, vegetable and legume crops on the farms of the co-operators.

CAPE MABOU COMMUNITY PASTURE SPECIES DEMONSTRATION

Peg Cummings, Crop Specialist
Leo Cox, Agriculture Representative

In 1988, the Cape Mabou Community Pasture was a site for a pasture species demonstration. Three one hectare blocks were seeded to three separate pasture mixes to determine a mix that would persist and yield well in that area.

In the spring of 1989, it was determined that the trial would have to be re-seeded. The orchard and perennial ryegrasses had been severely winter killed, with only the meadow fescue grass surviving. White clover survival was fair for both Ladino and Sonja varieties.

In early July 1989, the site was sprayed with 1.0 L/ha MCPA and 2.0 L/ha roundup, disced and re-seeded to four 1.0 ha blocks of a meadow fescue based forage mix:

Block I	- Farol Timothy	6 kg/ha
	Ensign Meadow Fescue	15 kg/ha
	Sacramento White Clover	2 kg/ha
Block II	- Farol Timothy	6 kg/ha
	Ensign Meadow Fescue	15 kg/ha
	Sacramento White Clover	3 kg/ha
Block III	- Farol Timothy	6 kg/ha
	Ensign Meadow Fescue	15 kg/ha
	Sonja White Clover	2 kg/ha
Block IV	- Farol Timothy	6 kg/ha
	Ensign Meadow Fescue	15 kg/ha
	Sonja White Clover	3 kg/ha

Meadow fescue and Timothy compliment each other well in a pasture mix and should survive under the prevalent winter conditions on the Cape. Two varieties and two seed rates of white clover were selected for establishment and survival observations, as well as for yield comparisons.

Due to very dry conditions over the summer of 1989, the seed mixes were very slow to establish, and broadleaf weed competition was high, but not as severe as in the previous year.

Yields (pasture cages), quality, regrowth and species persistence will be taken in 1989 with the aim of making pasture mix recommendations for quality pasture.

TIBOR OATS RATE OF SEEDING

Dwane Mellish
Assistant Director

This was the second year of a 3 year study investigating the response of Tibor Oats to a range of seeding rates.

Location:	Great Village	Co-operator:	Bob Cooper
Preceding Crop:	Carrots	Soil Type:	Sandy Loam
Seeding Date:	April 28	Experimental Design:	RCBD
Plot Size:	1.25m x 6m	Harvest Date:	Sept. 1

Seed Rates: 100, 200, 300, 400, 500, 600, seeds/m²

Fertilization: Planting 400 kg/ha 17-17-17
ZGS 30 100 kg/ha 34-0-0

Herbicide: Refine 20 g/ha + 200 ml/ha Assist ZGS 23

Pesticide: Cygon .5 L/ha aphid control
Sevin LRX Plus 3 L/ha - armyworm control

ANOVA TABLE FOR PARAMETERS MEASURED

	Plant Height	Heads m ²	Population m ²	Lodging Harvest
Rate	N.S.	**	*	N.S.
	Test Wt.	1000 K.Wt.	Yield	
Rate	N.S.	**	N.S.	
Rate	Heads /m ²	1000 K.Wt. (g)	Population /m ²	Yield (kg/ha)
100	240 c	34.7 ab	314 b	2.6 a
200	291 bc	35.1 a	371 ab	3.0 ab
300	312 bc	34.5 ab	293 b	3.0 ab
400	342 ab	34.1 b	348 b	3.2 ab
500	406.5 a	34.0 b	552 a	3.2 ab
600	402 a	33.1 c	539 a	3.4 b
LSD	78.7	.84	176	

Lodging was severe throughout the trial and the lodging was not related to seeding rate. Seeding rate influenced plant population, heads/m² and 1000 k.wt. but due to the lodging, it had only a small effect on yield.

FOLIAR FUNGICIDE COMPARISON ON WINTER WHEAT TO CONTROL SEPTORIA

**Dwane Mellish,
Assistant Director**

This is the first year of a trial conducted to identify foliar fungicide combinations to control Septoria on the winter wheat Perlo.

Location:	Canning	Co-operator:	Lyndhurst Farms
Seeding Rate:	450 seeds/m ²	Soil Type:	Sandy Loam
Plot Size:	2m x 6m	Harvest Date:	August 16
		Experimental Design:	RCBD

Fungicide: Bayleton 125 gai/ha ZGS 30/31 (blanket application)

ANOVA TABLE FOR PARAMETERS MEASURED

Fungicide	Septoria 2nd leaf ZGS 50	Septoria ZGS 50 flag	Septoria Head	Lodging Harvest	1000 k.wt.	Yield
Treatment	**	N.S.	**	N.S.	**	**

Treatment	Rate (g a.i./ha)	Application (ZGS)	Septoria (head) % (ZGS 80)	TKW (g/1000)	Yield (t/ha)
Check	-	-	9.8 a	43.9 de	7.0 g
Bayleton	125 +				
+ Tilt/Bravo	125/1000	31+57	5.1 d	47.1 ab	7.7 abc
Bayleton	125 +				
+ Tilt/Dithane	125/1760	31+57	6.9 abcd	47.6 ab	7.8 ab
Tilt/Bravo	125/1000	31	7.0 abcd	43.8 c	7.2 efg
Tilt/Bravo	125/1000	39	7.4 abcd	45.3 bcde	7.2 fg
Tilt/Bravo	125/1000	57	4.8 d	46.9 ab	7.7 abc
Tilt/Dithane	125/1760	31	9.3 ab	44.4 cde	7.5 bcdef
Tilt/Dithane	125/1760	39	8.7 abc	43.8 e	7.3 defg
Tilt/Dithane	125/1760	57	6.3 bcd	46.2 abcd	7.6 abcde
Tilt	125	31+57	6.1 cd	45.5 bcde	7.4 bcdef
Tilt	125 +				
+ Tilt/Bravo	125/1000	31+57	5.2 d	47.6 ab	7.9 a
Tilt	125 +				
+ Tilt/Dithane	125/1760	31+57	5.2 d	47.0 ab	7.8 abc
Tilt + Tilt	125 + 125	39+57	6.9 bcd	46.0 abcde	7.7 abc
Tilt/Bravo	125/1000 +				
+ Tilt/Bravo	125/1000	39+57	4.4 d	48.2 a	7.9 a
Tilt/Dithane	125/1760 +				
+ Tilt/Dithane	125/1760	39+57	6.9 bcd	47.0 ab	7.7 abcd
Bravo + Bravo	1000 + 1000	39+57	5.5 d	46.3 abc	7.4 cdef
Dithane + Dithane	1760 + 1760	39+57	6.9 abcd	47.1 ab	7.5 abcdef
Folicur	125 +				
+ Tilt/Bravo	125 /1000	31+57	5.8 cd	47.7 ab	7.8 abc
Folicur	125 +				
+ Tilt/Dithane	125/1760	31+57	5.3 d	46.0 abcde	7.9 a
Tilt + Tilt/ Bravo/Benlate	125 + 125/ 1000/250	31+57	5.0 d	47.2 ab	7.9 a
LSD (0.05)			2.5	2.0	.34

Conclusions:

Rainfall during the growing season was less than normal resulting in low disease pressure. Nearly all treatments increased yields and thousand kernel weights, as well as reduced septoria levels on the heads, but not all were significantly different from the check. The combination of Tilt/Bravo at ZGS 39 and 57 consistently performed well for all control indicators. The late growth stage treatments (ZGS 57) were most effective in controlling septoria and improving yield, indicating head protection is most important in protecting crop yield. The best results occurred when a combination systemic and protectant program was used following an application at ZGS 31, one notable exception being the combination Tilt/Bravo at ZGS 39 and ZGS 57.

PIONEER HIGH MOISTURE EAR CORN HYBRID EVALUATION

Eric Bosveld
Soil and Crop Specialist

Location:	Stewiacke East	Co-operator:	Winding River Farms Ltd.
Previous Crop:	Grass Pasture	Co-ordinator:	David Angevine
Planting Date:	May 19, 1989		Clarence's Farm Services
Planter Type:	Pneumatic Deutz Allis (Model 285)		
Harvest Date:	October 16, 1989		
Fertility:	Spring Manure worked in (45 m ³ /ha) 125 kg/ha 46-0-0 broadcast and worked in before planting 300 kg/ha 17-17-17 banded at planting		
Weed Control:	Roundup @ 2.5 l/ha in spring Tankmix of Atrazine @ 3.0 l/ha and Pardner @ 1.0 l/ha applied postemergent		

WINDING RIVER FARMS LTD. HMEC EVALUATION 1989

Company	Hybrid	% DM	Yield (kg DM/ha)	Yield Rank	Population (⁰⁰⁰ plants/acre)	Standability Rating
Co-op	2335	68.2	7225	6	23	fair
Pioneer	3995	68.1	4992	11	18	fair
Pride	K730	68.0	7408	4	26	excellent
Co-op	6312	64.8	6930	7	24	excellent
Funks	4017	64.8	5596	10	22	good to excellent
Pioneer	3954	63.7	7707	3	16	good to excellent
Pioneer	3969	63.5	7301	5	22	excellent
Pioneer	3979	63.3	6896	8	23	excellent
Hyland	3282	62.0	7938	2	28	excellent
Hyland	LG3	61.1	6197	9	27	excellent
Hyland	3251	60.8	8089	1	21	excellent
Average		64.4	6934		24	

- Notes:
1. The high moisture corn was harvested with a self-propelled forage harvester equipped with a snapper head.
 2. The trial was not replicated and therefore no statistical differences in yield and dry matter can be calculated.
 3. The data presented should be used only as a supplement to the information provided in publication 140 (the Atlantic Corn Hybrid Evaluation on Trials - Accumulated Performance Data).

PIONEER HIGH MOISTURE EAR CORN HYBRID EVALUATION

Eric Bosveld
Soil and Crop Specialist

Location:	Onslow	Co-operator:	Bob Fiddes
Previous Crop:	Corn	Co-ordinator:	David Angevine
Planting Date:	May 19, 1989		Clarences Farm Services
Planting Type:	John Deere Maxemerge	Harvest Date:	October 18, 1989
Fertility:	Manure (heavy), spring applied and worked in 250 kg/ha 20-0-20 worked in before planting 225 kg/ha 18-46-0 banded at planting		
Weed Control:	Tankmix of Laddock at 3 l/h Assist (1% of water vol.) and 4 l/ha Atrazine (500 g/l) applied postemergently		

FIDDES HMEC EVALUATION 1989

Company	Hybrid	% DM	Yield (kg DM/ha)	Yield Rank	Population ('000 plants/acre)	Standability Rating
Pride	K730	65.2	4809	11	23	good
Funks	4017	63.6	4771	12	24	poor to good
Pioneer	3954	62.7	6236	3	26	fair
Pride	K610	62.6	5710	5	20	fair
Dekalb	Dk235	62.5	5465	8	23	fair
Pioneer	3969	62.1	5430	9	20	fair to good
Hyland	LG3	61.1	5655	7	21	fair
Pioneer	3995	60.5	3721	13	22	fair
Pioneer	3979	59.8	6734	1	24	good
Pickseed	2477	59.1	5664	6	20	poor to fair
Hyland	3282	58.9	6088	4	23	good
Hyland	3251	57.6	6290	2	23	good
Hyland	2428	49.9	5420	10	22	poor
Average		60.4	5538		22	

- Notes:
1. The high moisture ear corn was harvested with a self-propelled forage harvester equipped with a snapper head.
 2. The trial was not replicated and therefore no statistical differences in yield or dry matter can be calculated.
 3. The data presented should be used only as a supplement to the information provided in publication 140 (the Atlantic Corn Hybrid Evaluation on Trials - Accumulated Performance Data).

KINGS CO. SOIL & CROP GRAIN CORN TRIAL

A.J. Wilson
Soil and Crop Specialist

Co-operator: Peter Clarke
Planting Date: May 18, 1989
Planting Rate: 62,500 plants/ha
Fertility: Hen manure (fall applied)
150 kg/ha 17-17-17 (in planter)
100 kg/ha of 46-0-0 (top dressed)
Herbicide: 2.5 L/ha Dual PFI
1.5 L/ha Bladex PFI
Harvested: November 2, 1989 Combine
October 31, 1989 Hand Harvest

Table 1: Yield Data Corn Hybrid Trial - 1989

Hybrid	Type	Standability	% H ₂ O	(t/ha) Combine Yield 15.5%	(t/ha) Hand Yield 15.5% H ₂ O
Pioneer 3979	SC	Very good	23.3	7.0	6.6
DeKalb 235	OC	Fair	22.8	6.3	5.9
Pickseed 2555A	MS	Poor	22.6	6.2	5.6
Pickseed 2477	3W	Very good	22.3	5.6	5.6
Funks G-4017	3W	Very good	20.8	5.1	5.5

Table 2: Input Costs (\$/ha)

	Pioneer 3979	DeKalb 235	Pickseed 255A	Pickseed 2477	Funks G-4017
Seed	76.56	67.18	76.56	71.09	76.56
Drying handling	240.80	214.01	209.13	186.87	160.75
17-17-17	49.65	49.65	49.65	49.65	49.65
46-0-0	36.50	36.50	36.50	36.50	36.50
Dual	55.84	55.84	55.84	55.84	55.84
Bladex	27.19	27.19	27.19	27.19	27.19
Application (2x)	30.00	30.00	30.00	30.00	30.00
Harvest \$/ha	90.00	90.00	90.00	90.00	90.00
Tillage \$/ha	35.00	35.00	35.00	35.00	35.00
Seeding \$/ha	25.00	25.00	25.00	25.00	25.00
Input Costs	666.53	630.37	634.86	607.14	586.48
Receipts*	1190.00	1071.00	1054.00	952.00	867.00
Net over (\$/ha)					
Input	523.47	440.63	419.14	344.86	280.52

* Based on combine yield @ \$174.00/tonne

DISCUSSION:

1989 proved to be an exceptional year for corn. Table 2 shows that variety selection, i.e. matching varieties to corn zone and date of planting is extremely important.

A variety that is too early maturing will lack yield, whereas a late maturing variety will lack maturity and delay harvest. Therefore, it is important to choose varieties that are recommended for your area.

DEKALB-BISHOP'S GRAIN CORN HYBRID TRIAL*

James Borden, Co-operating Farmer
Jack van Roestel, Crops Extension Specialist

Location: Canard, Kings Co., N.S.
Planting Date: May 17, 1989
Planting Rate: 65,000 plants/ha (26,000 plants/ac.)
Fertility: 105 kg/ha (95 lbs/ac) of 16-40-5 in planter, plus
450 kg/ha (400 lbs/ac) of 17-17-17 incorporated, and
105 kg/ha (95 lbs/ac) of 46-0-0 topdressed at 8-10
leaf stage
Herbicide: Bladex 80 WP (4.25 L/ha) & Banvel 480 (1.25 L/ha)
tank-mixed and applied as an early post-emerge
(prior to 2nd leaf).
Harvest Date: October 16, 1989

Hybrid	% T.D.N.**	% Moisture	Yield (t/ac 15.5%)	Yield*** (t/ha 15.5%)
Bishop's 30-30	94.0	33.0	3.4	6.6
DeKalb 291	93.0	32.0	2.8	5.4
DeKalb 233	94.0	28.0	2.7	5.3
DeKalb 333	91.6	32.0	2.1	4.1

* The trial was conducted by Borden Seeds, Canard, (DeKalb-Bishops-Funks Corn Seed, Dealer for Western N.S.). Yields and tabulation were done by Jack van Roestel, Provincial Crops Extension Fieldman. Each hybrid yield was taken from a sample area of 0.2 ha (0.5 acres).

** Total Digestible Nutrients (T.D.N.) is an indication of the energy content in a forage/feed (T.D.N.% = D.E. 0.04409) given at 100% D.M.

*** Yields have been measured in metric tonnes. Harvest was done with a 6-row combine with both the chaffer and sieve in place, so no cob content was present.

A.L.F.I. CANOLA PRODUCTION PROJECT FOR 1989

Jack van Roestel
Crops Extension Specialist

Nova Scotia's canola crop this year consisted of 75 ha yielding a total of 123.4 dried tonnes (Refer to Table 1). There were eight growers in total with production in the Kings County, Great Village and Tatamagouche (Colchester Co.) areas. In 1989, the largest tonnage of winter canola was grown with quite reasonable results.

The '89 crop benefited from the warm spring and abnormally high heat units resulting in vigorous growth and early flowering. However, most fields suffered from both moisture stress and sclerotinia white mold disease problems after that (July-mid August) which affected pod set at flowering and seed maturation.

The sclerotinia fungal disease is not new to us in Nova Scotia, but is a problem that can be suppressed somewhat with better nitrogen and fungicide timing, and watching the sequence of canola grown in the rotation, regarding other crops that host sclerotinia (e.g. beans, peas, carrots).

Table 1: Individual Farmer's Canola Production in 1989

Producer	Hectares	Tonnes	Moisture (wt.avg.)
Bartel, Paul (spring)	32.0	46.9	17.1
Fuller, John (spring)	9.4	15.8	15.7
Isaac, Franklin (spring)	3.5	3.6	24.0
Kinsman, George (winter)	11.0	21.0	8.9
Lyndhurst Farms (winter)	4.0	9.4	12.2
Meredith Farms (spring)	8.0	7.1	28.0
Webb, Frank (spring)	N/A	1.8	27.1
Wilmar Acres (spring)	2.8	7.2	24.6
Wilmar Acres (winter)	4.2	10.6	10.3
	74.9	123.4	16.0

The future of canola production in Nova Scotia is still rather clouded due to inconsistent world prices and the lack of local markets. However, a committed group of representatives from the Provincial Grains Commission and the Nova Scotia Winter Grain Marketing Board have investigated and purchased a small "pilot-type" mechanical press system which would produce a reasonable grade oil and a whole seed protein cake. This canola processor will be located in Canning and operating in Feb. '90 to produce an oil and meal which can be sold to the feed manufacturers for use in local livestock rations. Possibly, in time, canola markets in edible oil, fossil fuel or other industries may also develop.

The canola producers of Nova Scotia have appreciated the A.L.F.I. program's production subsidy & market stabilization assistance over the past three years and encourage continued support while local processing and marketing is in its infancy.

N APPLICATION ON SOYBEANS

Eric Bosveld
Soil and Crop Specialist

Location: Hardwoodlands, N.S.
Co-operator: Grant Bros.
Seeding Rate: 125 kg/ha
Inoculant: 10 kg/ha granular plus peat inoculant
Seeding Date: May 2, 1989
Cultivar: Mapi® Amber
Harvest Date: November 1, 1989
Weed Control: Tank mix of 2.0 l/ha Dual and
2.0 l/ha Lorox applied preemergent
Soil Type: Falmouth (well drained)
Soil Analysis: O.M. pH P₂₀₅ K₂O Ca Mg
5.0 5.9 396(H+) 745(H+) 2973(M-) 270(M)
Fertility: Manure (late winter)
450 kg/ha 10-10-30 + .2B at seeding

There was a fair bit of interest in the production of soybeans in 1989, however the effectiveness of currently used inoculants has been questioned under our typical cool soil conditions in the spring. Dr. Richard Sanders, a Researcher at N.S.A.C., is evaluating strains of *Rhizobium* that are effective and adapted to Nova Scotia conditions. However, in the meantime some growers have increased their nitrogen level to improve early season development and ultimately yield and maturity of their crop. This demonstration was set up to evaluate the effectiveness of supplemental nitrogen topdressing. The majority of the field received an additional 110 kg/ha 34-0-0 at the 2 leaf stage, however one strip was left untreated for comparative purposes. The results are reported below in Table 1.

Table 1: Soybean Yields and Quality

Treatment	Yield (kg/ha)	% C.P.	% D.M.
Additional N	1987	38.1	89.4
No Additional N	1795	37.1	89.4

The additional nitrogen increased the yield slightly, although due to within plot variation it may be questionable whether it was significant. The crude protein also increased with the additional nitrogen.

Nodulation was not completely evaluated, however it appeared as though the plants in the untreated area had more nodules early in the season. By August there was no obvious difference in nodule number.

The additional nitrogen had no affect on the maturity of the soybeans.

**SCREENING HERBICIDES FOR WILD OAT CONTROL
IN SPRING WHEAT AND BARLEY
ALFI PROJECT # TT93**

Lise LeBlanc
Weed Project Co-ordinator

Wild oats are on the increase in Nova Scotia. They are highly competitive and have been shown to decrease yields by as much as 50%. It has been very difficult to control wild oats because of seed longevity (seed can survive up to 7 years in the soil). Current wild oat herbicides require most of the season to control wild oats, therefore enabling them to compete with the crop.

Location:	Waterville	Water Volume:	200 l/ha
Co-operator:	K. Refuse	Pressure:	241 kPa
Soil Type:	Sandy Loam	Experiment Design:	RCBD
Crop:	Spring Wheat (Max), Leger, Rodeo Barley	Plot Size:	2m x 5m
Seeding Date:	May 5, 1989	Replicates:	3
Harvest Date:	August 17, 1989	pH:	5.0
Crop Stage:	Zadoks: 14	Spray Date:	May 26, 1989
		Weed Stage:	3 leaf stage

Treatments	Kg a.i./ha	% Wild Oat Control*		Yield Tonnes/ha
		June/89	August/89	
Control	-	0	0	2.2
Hoegrass	0.80	15	95	2.9
Mataven	0.42	25	75	3.3
Avenge	0.85	5	80	2.9
Assert	0.60	10	95	3.0

* 0 meaning no control and 100 meaning complete control.

The wild oat population within the field was very high. When the herbicides were applied, they injured both the crop and the wild oats. By June, both seemed to grow out of the damage but by the end of the season, control of wild oats was seen when they did not produce seed heads.

Both recommended and experimental herbicides required the entire season to control wild oats. By using the herbicides, the yield was increased by almost a tonne/ha. If the wild oats had been controlled early in the season, yield increase would have been much greater.

Although the herbicides required all season to control wild oats, it decreased the number of seeds in the seedbed. Wild oat herbicides must be applied for at least 4 years to decrease the seedbed population.

**FALL AND SPRING HERBICIDE TREATMENTS
IN WINTER WHEAT FOR SCENTLESS CHAMOMILE
ALFI PROJECT # TT93**

Lise LeBlanc
Weed Project Co-ordinator

Scentless chamomile has been difficult to control in winter wheat because it acts as both a winter and spring annual. Additionally, it is also herbicide tolerant after it has reached rosette stage. It can germinate in the fall, compete with the crop and then be at an advanced growth stage during spring application (herbicide resistant). Some herbicides have no residue to control new emerging seedlings after application.

Trials were put out in the fall, 1988 and spring, 1989 using the same herbicides to test for a difference in control depending on time of application.

Location:	Nappan, N.S.	Water Volume:	200 l/ha
Co-operator:	Pedersen	Pressure:	241 kPa
Crop:	Absolvent	Experimental Design:	RCBD
Seeding Date:	September 25, 1988	Replicates:	4
Crop Growth Stage:	Fall (Zadok 23), Spring (Zadok 32)	pH:	6.8
Weed Growth Stage:	Fall (4-5 leaf), Spring (rosette)		

Treatments	kg a.i./ha	% Scentless chamomile control*	
		June '89 Rating	
		Fall '88	Spring '89
Control	-	0	0
Buctril M	0.56	75	70
Dyvel	0.50	85	60
Target	0.60	50	75
Estaprop	1.10	60	90
Kil-mor	0.55	85	85
Refine	0.015	70	90
Ultim	0.015	95	100
MCPA	0.80	85	20

* - 0 meaning no control and 100 meaning complete control

Target and Estaprop seemed to give better control in a spring application while MCPA gave better control in a fall application. It was difficult to give good ratings for these trials because of the uneven winter wheat stand. This was due to winter kill and uneven fertilizer application.

The best treatments of these trials were put out in the fall of 1989 to re-evaluate scentless chamomile control.

CONTROL OF TRIAZINE RESISTANT LAMB'S QUARTERS IN CORN

D.J. Doohan and K.R. Silver

Screening trials continue in the area of triazine resistant lamb's quarters control in corn to keep abreast of new development by the chemical industry. As new herbicides are developed, registered and recommended for use in our area; we must have first hand knowledge of how they will perform on crop and weeds under our local soil and weather conditions. The possibility always exists that new treatments in a test may prove to be superior to available products through advantages such as better crop safety, more herbicidal activity toward target weeds or more economically viable. For growers who know they have triazine resistant lamb's-quarters we seek for better residual herbicides. For those who get caught with escape weeds, we look for better post-emergent activity.

Location:	Upper Falmouth	Experimental Design:	RCBD
Variety:	Dekalb	Volume:	240 L/ha
Planting Date:	May 22/89	Pressure:	262 kPa
Previous Crop:	Corn	Soil Type:	Sandy Loam

The trial area received an application of preplant incorporated Sutan + Atrazine. Treatments in the trial were applied to control escaping lamb's quarters.

Treatments	Rate/ha kg active	Method	% Lamb's-Quarters Control*	
			June/89	July/89
Control	---	---	0	0
Atrazine	1.75	pre**	0	0
Lorox	2.00	pre	100	99
Banvel	0.60	pre	100	69
Dinoseb Ester	3.36	pre	100	69
Pardner	0.28	post***	--	98
Buctril M	0.56	post	--	98
Banvel	0.28	post	--	99
Laddock + Assist	1.6 + 2 L/ha	post	--	98
Basagran + Assist	0.84+ 2 L/ha	post	--	97
Basagran + Assist	1.08+ 2 L/ha	post	--	98
Basagran Forte	1.08	post	--	97
MCPA Amine	0.50	post	--	75
2,4-D	0.50	post	--	97

* 0 meaning no control and 100 meaning complete control

** Preemergent application, May 25, 1989

*** Postemergent application, June 22, 1989 (Crop 5-6 leaf, Weed 4-6 leaf)

-- Evaluation not applicable, before treatments applied

The pre Lorox treatment is not suited to this soil type because it showed moderate burn crop injury.

Similar results, loss of residual control, from pre treatments of Banvel and Dinoseb Ester could be a result of heavy rains leaching these soluble herbicides.

Basagran Forte treatment compares favourably with Basagran + Assist.

In this trial, 2,4-D appears to be a safe, effective and economical treatment.

CONTROL OF SMOOTH CRABGRASS IN CORN

D.J. Doohan and K.R. Silver

One of the more common weed problems encountered in Maritime corn fields these days is the escape of annual grass species. Two major reasons are usually the cause for these problems. Either the residual control from the herbicide used does not persist long enough into the season or timing of herbicide application is too late for good post emergence control of annual grasses in corn. By evaluating the various herbicide options available, this trial searches for improved residual control and improved post-emergence control while continuing to provide acceptable crop tolerance. The site was chosen before weed emergence as a result of reported weed problems the previous year. The anticipated population of annual grasses did not materialize.

Lamb's quarters was not a primary target species. This weed was evaluated because it was present and planned treatments for crabgrass control that did not result in broadleaf control was treated with Pardner to control lamb's quarters.

Experimental Location:	Lower Onslow	Experimental Design:	RCBD
Variety:	Pioneer 3979	Volume:	240 l/ha
Planting Date:	May 20, 1989	Pressure:	262 kPa
Previous Crop:	Corn	Soil Type:	Sandy Loam

Treatments	Rate/ha kg active	Method	% Weed Control* LQ CG* ²
Control	-	-	0 0
Primextra (3:2)	3.25	pre* ³	95 100
Primextra (3:2)	4.25	pre *	98 100
Primextra (3:2)	3.25	post ⁴	96 100
Primextra (3:2)	4.25	post	97 100
Primextra (2:1)	2.90	post	96 100
Dual + Topogard	1.92 + 1.1	post	95 99
Bladex	3.25	pre	95 99
Bladex + Atrazine	2.25 + 1.1	pre	96 100
Bladex + Atrazine	2.25 + 1.1	post	93 100
Atrazine + Simazine	1.7 + 1.7	pre	96 100
Atrazine + Simazine + Oil	+ 17 L	post	93 100
Atrazine + Oil	2.25 + 17 L	post	96 99
Lorox* ⁵	2.0	pre	100 100
Sencor + Atrazine	0.5 + 1.1		
+ Dual* ⁵	+ 1.68	pre	83 100
Buctril M* ⁵	0.56	post	97 0

* 0 meaning no control and 100 meaning complete control

*² LQ - Lamb's-quarters, CG - Crabgrass

*³ pre-preemergent application, May 26, 1989 (Weed - LQ in cotyledon stage)

*⁴ post-postemergent application, June 1, 1989 (Crop and CG in 2 leaf stage)
Pardner was sprayed June 13, 1989, LQ in 2-6 leaf stage.

*⁵ Treatments that did not receive the Pardner application.

Population of lamb's quarters was moderate and smooth crabgrass production was light. A heavier population of crabgrass would probably have resulted in a broader range of control. The preemergence Lorox treatment is far too injurious for this soil type. It caused a 50% decrease in crop stand and vigor. A broader range of grass species for evaluation would be preferred. The serious grass escapes hoped for with some treatments did not materialize.

**BARLEY TOLERANCE TO HERBICIDES
AT TWO GROWTH STAGES
ALFI PROJECT # TT93**

Lise LeBlanc
Weed Project Co-ordinator

Every year, producers experience injury to their grain crops from commonly used herbicides for broadleaf weed control. This problem has increased due to more complex mixture of growth regulator herbicides.

A trial was conducted using currently recommended herbicides. Barley was sprayed at Zadoks 12 (2 leaf stage) or Zadoks 32 (2 node stage). Herbicides are recommended to be applied between Zadoks 12 to Zadoks 38 (flag leaf stage).

Location:	Great Village, N.S.	Water Volume:	200 l/ha
Co-operator:	R. Cooper	Pressure:	234 kPa
Soil Type:	Sandy Loam	Experimental Design:	RCBD
Crop:	Leger Barley	Plot Size:	2m x 5m
Seeding Date:	April 28, 1989	Replicates:	4
Harvest Date:	August 9, 1989	pH:	5.3

Treatments	L/ha	Tonnes/ha	
		Zadoks: 12	Zadoks: 32
Control	-	5.5	5.5
2,4-D	1.70	5.3	5.4
MCPA	1.70	5.5	5.7
Target	1.50	5.6	4.7*
Dyvel	1.25	5.6	4.7*
Buctril M	1.00	5.5	4.8*

All the herbicides caused an initial damage of slight yellowing and stunting of the leaves at Zadoks: 12. The crop outgrew this damage within a couple of weeks. There was no decrease in yield. More damage occurred at Zadoks: 32. There was severe stunting, chlorosis and necrosis of leaf tissue and a decrease in yield. Target, Dyvel and Buctril M decreased the yield by almost a tonne/hectare. MCPA and 2,4-D did not decrease the yield although 2,4-D did show initial damage of stunting and yellowing of the leaves.

FALL ROUND-UP APPLICATION FOR QUACKGRASS CONTROL ALFI PROJECT # TT93

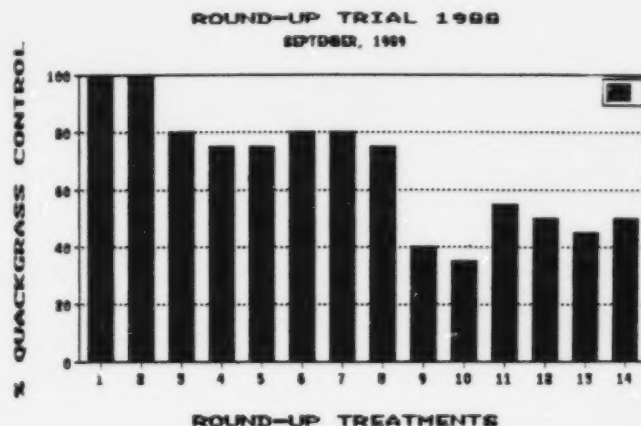
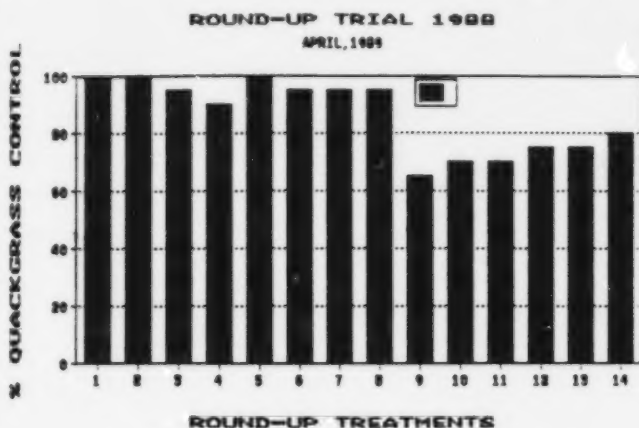
Lise LeBlanc
Weed Project Co-ordinator

Perennial weeds, especially quackgrass, can create serious weed problems. A single quackgrass plant can produce up to 450 feet of rhizomes and 200 shoots in a single year. A trial was conducted at a field scale level to determine long term control of quackgrass using various rates of Round-up, water volumes, additives and discing verses nondiscing. The trial was put out in the fall of 1988 and will be monitored for three years.

Location:	Lower Onslow Lower Truro	Round-up Rates:	1.2, 2.5, 5.0 L/ha
Co-operators:	R. Fiddes J. Kent J. Cutten	Water Volumes:	100 and 200 L/ha
		Additives:	Frigate Ammonium Sulfate

Farm	Disc	Spray
1	Sept. 13/88	Oct. 17/88
2	Sept. 20/88	Oct. 18/88
3	Sept. 24/88	Oct. 28/88

Most of the treatments, except for 1.2 l/ha, gave good control in the first growing season. At the beginning of the season, the two highest rates of Round-up gave 85-100% control while the low rate had a 60-75% control rating. By the end of the season, the low rate gave poor control (40-50%), while the two higher rates still had 85-100% control. The additives showed more effect with the lowest rate of Round-up.



<u>R.U.</u>	<u>W.V.</u>	<u>ADD.*</u>	<u>R.U.</u>	<u>W.V.</u>	<u>ADD.</u>
1) 5.0	100	-	8) 2.5	200	Frig.
2) 5.0	200	-	9) 1.2	100	-
3) 2.5	100	-	10) 1.2	200	-
4) 2.5	200	-	11) 1.2	100	A.S.
5) 2.5	100	A.S.	12) 1.2	200	A.S.
6) 2.5	200	A.S.	13) 1.2	100	Frig.
7) 2.5	100	Frig.	14) 1.2	200	Frig.

* R.U. - Round-up rate (L/ha), W.V. - Water Volume rate (L/ha), ADD. - Additives (A.S. - Ammonium Sulfate, Frigate)

The disced section of the field had 10-20% more control of quackgrass than the nondisced section. More differences between the treatments should become more apparent during the next growing season.

**INTEGRATED PASTURE MANAGEMENT FOR IMPROVED WEED CONTROL
ALFI PROJECT # TT93**

Peg Cummings, Crop Specialist
Lise LeBlanc, Weed Project Coordinator

Despite the cultural, chemical and biological methods that have been recommended for controlling weeds in pastures, weeds persist as a serious problem in pastures throughout the province. Many of these weeds are poisonous to livestock, unpalatable or of low feeding value. The opportunity cost of pasture weeds is a high, although often inconspicuous, cost to the livestock industry.

A trial was conducted to evaluate, adapt and demonstrate a variety of crop/weed management techniques for pasture weed control. At the end of the project, we will be able to economically evaluate how a fall herbicide treatment followed by successive herbicide treatments will improve forage quality and yield.

Location:	Mabou	Pasture Mix:	7 kg/ha Frode Orchard Grass
Co-operator:	D. VanZutphen		15 kg/ha Mimer Meadow Fescue
Plot Size:	3 ha/block		2 kg/ha Ladino White Clover
Treatments:	Block 1: Control (No treatments)		
	Block 2: Tropotox Plus (4.25 l/ha), June/89		
	Block 3: Tropotox Plus (4.25 l/ha), June/89		
	+ Roundup (3 l/ha), Oct/88		
	Block 4: Roundup (3 l/ha), Oct/88		

The treatments were clipped for weed control on August 1, 1989.

The pasture will be forward strip grazed with fifty cows in the next growing season. Further analysis will be conducted on crude protein, TDN, weed counts and forage yields.

The site was seeded May 24/89. It was fertilized with 3000 L manure (13 m/ha) + 200 kg/ha 12-24-24 and worked into the soil prior to seeding. 200 kg/ha of 34-0-0 was applied on August 5, 1989.

The main weed species found in the field were quackgrass, plantain, dandelion, knotweed, lady's thumb, wild mustard and common chickweed. During July, weed control was highest with Roundup + Tropotox Plus (80%). Tropotox Plus alone gave 65% weed control followed by Roundup at 60% weed control.

Treatments	Rate l/ha	% Overall Weed Control	August/89			Tonnes Dry Matter/ha
			*CP	TDN	ADF	
Control	-	0	24.3	67.4	28.9	1.96
Tropotox Plus	4.25	80	25.7	67.4	28.9	1.83
Roundup+Trop.	3.0 + 4.25	90	25.5	67.0	29.2	2.16
Roundup	3.0	60	27.5	69.8	27.0	1.51

*CP - Crude Protein, TDN - Total Digestible Nutrients, ADF - Acid Detergent Fiber

Treatments	Rate l/ha	September/89			Tonnes Dry Matter/ha
		CP	TDN	ADF	
Control	-	21.8	66.9	29.3	3.69
Tropotox Plus	4.25	20.4	64.4	31.2	3.50
Roundup + Tropotox	3.0 + 4.25	22.0	66.0	30.0	3.22
Roundup	3.0	20.7	66.9	29.3	3.16

Roundup + Tropotox Plus gave the best overall weed control. There was excellent control of quackgrass, mustards and plantain. Since it was an extremely dry season, the Tropotox Plus set the clovers back in height and stand number.

There was little difference between forage yield and quality between the treatments in the establishment year. The difference should become evident in the next growing season.

**SCREENING HERBICIDES FOR BROADLEAF WEED CONTROL
IN SPRING WHEAT AND BARLEY
ALFI PROJECT # TT93**

Lise LeBlanc
Weed Project Co-ordinator

There are several hard to control broadleaf weeds which can cause serious problems for producers trying to increase their cereal production. Poor control may be due to improper timing of herbicides.

Location:	Nappan, N.S.	Water Volume:	200 L/ha
Co-operator:	Pedersen	Pressure:	241 kPa
Soil Type:	Sandy Loam	Experimental Design:	RCBD
Crop:	Max Spring Wheat, Leger & Rodeo Barley	Replicates:	4
Seeding Date:	May 30, 1989	pH:	5.2
Harvest Date:	September 5, 1989	Crop Growth Stage:	Zadoks 15
		Weed Growth Stage:	3-4 Leaf Stage

Treatments	Kg a.i./ha	% ¹ Crop Injury	% Weed Control			Yield t/ha		
			HN* ²	SW	LT	Leger	Rodeo	Max
Control	-	0	0	0	0	4.8	4.2	3.1
Target	0.50	10	65	100	95	5.0	5.0	3.3
Buctril M	0.56	5	90	85	100	5.1	5.2	3.5
Refine	0.013	20	95	40	100	4.7	4.9	3.4
Refine	0.015	20	100	40	100	5.1	5.5	3.6
Banvel + 2,4-D	0.11+0.42	5	100	50	100	4.8	5.2	3.5
Ultim	0.015	20	100	100	100	4.8	5.4	3.6

*¹ 0 meaning no injury and 100 meaning complete kill.

*² HN - Hempnettle, SW - Grass Leaved Stitchwort, LT - Lady's thumb

The new Refine herbicide showed an initial damage of severe yellowing and stunting. It outgrew this damage and did not decrease the yield.

Most of the weeds were controlled. This was due to early herbicide application (the weed was at 3-4 leaf growth stage) and there was good crop competition (very dense crop stand). These two factors combined to give excellent control of some of the harder to control weeds.

**UPDATE ON FIELD CROPS EXPO '90
JULY 15-18TH, 1990, WOLFVILLE, N.S.
A.L.F.I. PROJECT # TT75**

Prepared by Field Crops Expo '90 Steering Committee

Field Crops Expo '90, the Atlantic Provinces' first major cropping exposition-conference, is going to be quite a show. The project organizers are expecting over 2,000 overall participants during this 3 1/2 day, "Informative Cropping Season Vacation", held in the Wolfville area of Nova Scotia.

Field Crops Expo '90 is a project organized through the Nova Scotia Federation of Agriculture which is being partially funded by the Canada/Nova Scotia Livestock Feed Initiative through the Technology Transfer and Human Resource Development Programs.

Field Crops Expo '90 is being organized by a Steering Committee of 14 members with 5 subcommittees for each of accommodations, conference, site exposition, publicity and finance. The Steering Committee is comprised of representatives from the farming sector, agri-business, Federal and Provincial Departments of Agriculture. Jack van Roestel, Soils & Crops Specialist, is the Steering Committee chairman and Janice Lutz, part-time manager, works with all the committees and manages the overall operations.

Accommodations for the 3 1/2 day event will be at Acadia University, Wolfville, where the conference is also being held. Double and single rooms are available and social events such as a reception and barbeque will be handled by Marriot, the food service company at Acadia. Buses will shuttle participants between Acadia and the exposition site in Sheffield Mills.

An official opening keynote address followed by a wine and cheese reception will kick off the program on Sunday night, July 15th. Monday will be a site day, Tuesday will be a conference day and Wednesday will be the final on-site day.

The exposition program of Field Crops Expo '90 will be held on a 22-hectare parcel of land in Sheffield Mills, Kings County. The land is being leased from Wilmar Acres and consists of 2 fields on either side of a secondary highway. One field, 13 hectares, will be used for equipment and machinery displays and demonstrations. The machinery demonstrations will highlight operational technique on everything from tillage-seeding-harvesting equipment. The 9 hectare field is for booth displays, forage, cereal and soil demonstration plots, a plowing match, information centre and parking. The forage and winter cereal demonstrations are well established and the remaining cereal plot area is ready for spring planting.

The roadways and remaining area is established as turf and the plowing match area is in alfalfa and timothy. The booth display area is ready for set-up and many industry exhibitors have planted their own demonstration plots behind their booth space. Exhibitors have the choice of renting space in a 40' x 60' tent, renting half or all of 20' x 20' or 20' x 40' tents.

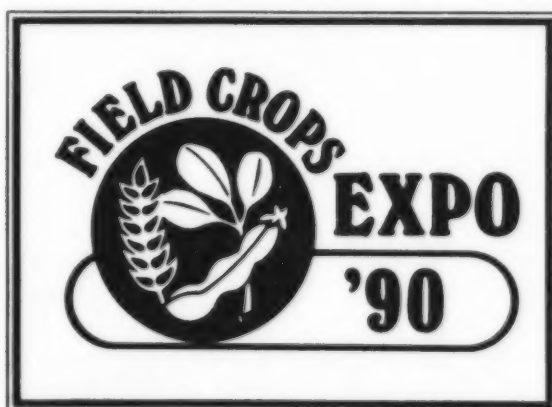
Thirty-two exhibitors from either agri-business, commodity or "governmental" groups have been committed to date and at least another 6-10 applications are expected by late December. At least a dozen farm machinery dealers will be represented and booth space is being rented out to agricultural businesses, organizations and related agencies. The site committee plans to bring several pieces of ALFI-funded equipment to the site for demonstration.

The conference will begin Tuesday morning with a one-hour address to the delegates on the Expo '90 theme "Maximum Economic Yield" in University Hall. After this lecture, the delegates will walk to the Beveridge Arts Centre for five series of six concurrent sessions, one hour each. The day will conclude with a series of bear pit sessions so participants can get to know the individual resource people better. Six lecture rooms will be utilized with a combined capacity of 705 seats. If pre-registration indicates a larger group is expected, there are several rooms of 60 seats and one of 300 seats available.

For spouses and other people accompanying Field Crops Expo '90 delegates, an "Accompanying Persons Program" will be offered on the day of the conference.

Field Crops Expo '90 is being promoted in newspapers, farm publications and on radio. Also, Nova Scotia Department of Agriculture & Marketing personnel and Nova Scotia Federation of Agriculture members are promoting it through their work and organizations. The publicity committee has produced a promotional slide/sound presentation which will be shown at exhibitions and meetings of commodity, federation, government and other agricultural organizations in the Maritime Provinces throughout the coming months. Field Crops Expo '90 is expected to be a very educational "cropping season vacation" for the expected 2,000 Maritime farmers and agrologists.

The planning for Field Crops Expo '90 is proceeding on schedule and interest in this event is growing. Field Crops Expo '90 is designed to deliver practical production information to assist producers in the Atlantic Provinces in achieving "Maximum Economic Crop Yields".



ORGANIC FERTILIZER

A.J. Wilson
Soils and Crops Specialist

Procedure: Organic Fertilizer on grain corn - fish silage made from 2% formic acid and 3% phosphoric acid was delivered from Casev's Fishery on the 5th of May, 1989 and added directly to a hog manure tank at the rate of 32:1 hog manure/fish silage.

Hog manure and hog manure/fish silage were applied preplanting to Hyland 2219 grain corn at 33 m³/ha. The analysis and treatments were as follows:

Table 1: Organic Fertilizer Analysis

Product	Dry Matter	pH	% N	% P ₂ O ₅	% K ₂ O
Hog manure	2.2	6.7	0.24	0.17	0.09
Fish Silage	25.4	4.3	2.0	1.05	0.27
Hog manure fish silage 32:1	22	6.6	0.29	0.19	0.10
Soil Analysis Required		6.2	120	60	95

Table 2: Fertilizer Applied to Grain Corn

Pre Plant	pH	N	P ₂ O ₅	K ₂ O
Treatment A Hog manure 33 m ³ /ha	6.7	79	56	30
Treatment B Hog manure/fish silage 32:1	6.6	96	63	33
Treatment A & B in the planted 160 kg/21-22-14		34	35	22
Post-emergence 112 kg 44-0-0		49	0	0

Table 3: Harvest Data
Total Nutrients Applied (kg/ha)

	N	P ₂₀₅	K ₂₀	Yield 85.5% DM (t/ha)	% H ₂ O
Treatment A	162	91	52	7.6	29.3
Treatment B	179	98	55	7.9	27.5

DISCUSSION:

The one major drawback to Fish silage made from 2% formic acid and 3% phosphoric acid is the low pH (4.3). It took approximately 13 t of lime/tonne of fish silage to obtain a pH of 6.5.

Adding fish silage to hog manure at low rates (32:1) has little effect on pH within the storage tank (Table 2).

Fish silage did increase N, P and K in the hog manure and did increase yields slightly in a non-replicated trial (Table 4).

The addition of fish silage did supply more N and P₂₀₅ than needed to grow a good crop of corn using the commercial fertilizer application that was applied, but did not supply enough K₂₀ (Table 2 and Table 4).

Instead of using 160 kg of 21-22-14 in the planter, it might be better to use 160 kg of 5-10-30 banded.

Organic Fertilizer on Grass Forage

PROCEDURE:

The formic and phosphoric acid was replaced in the fish silage with sulfuric acid and mixed with manure at the rate of 19:1 manure to fish silage. In addition to fish silage, fish emulsion (stickwater) was also tried. In total, 5 different treatments were applied to a grass forage on the 20th of July after the first cut.

Treatments:

1. Fish emulsion (drip) 4.4 m³/ha
2. Fish emulsion overall spray 44 m³/ha
3. Hog manure fish silage (sulfuric) 19:1 44 m³/ha
4. Fish emulsion 4.4 m³/ha and hog manure 44 m³/ha
5. Hog manure 44 m³/ha

Table 4: Organic Fertilizer Analysis

Product	% DM	pH	% N	% P ₂₀₅	% K ₂₀
Fish emulsion	42.6	5.9	4.8	0.32	0.89
Sulphuric fish silage	25.2	4.5	2.2	0.57	0.23
Hog manure & fish silage	4.5	6.4	0.23	0.25	0.18
Hog manure	4.0	6.4	.12	0.23	0.18

Table 5: Nutrients Applied/Hectare

Product	% DM	N	P ₂₀₅	K ₂₀
Fish emulsion	42.6	211	14	39
Hog manure sulphuric fish silage 19:1 44m ³ /ha	4.5	101	110	79
Hog manure* fish emulsion 10:1 44m ³ /ha + 4.4/m ³ /ha		263	115	118
Hog manure 44 m ³ /ha	4.0	52.8	101	79

* Split application

Table 6: Organic Fertilizer Yield Data

Product	DM	% P	% TDN	Replacement \$ Value P & TDN
Fish emulsion drip	2400	16.1	60	413.00
Fish emulsion spray	3060	-	-	566.00
Hog manure & fish silage 19:1	3150	20	65	578.00
Hog manure & fish emulsion 10:1	3140	17	64	571.00
Hog manure	2870	-	-	519.00

DISCUSSION:

Sulphuric acid fish silage suffers from a relatively low pH. The low pH did not affect the pH within the hog manure storage tank at a ratio of 19 hog manure to 1 of fish silage. The pH of fish emulsion was better at a pH of 5.9.

Fish emulsion added to hog manure at a ratio of 10:1 hog manure to fish emulsion greatly enhanced N and K_{20} at Jim Lamb's (Table 5).

Spraying fish emulsion is definitely not the way to apply fish emulsion.

The Hardy pump used to apply fish emulsion gummed up making it necessary to apply the remainder of the fish emulsion as a drip. The drip lacked coverage resulting in burn to the grass and depressed yield.

It seems the easiest way to handle this product would be to add it to the tank before agitating.

Treatments were applied on July 20th, 1989. Considering the late date, yields were more than acceptable (Table 8).

CONCLUSION:

Both fish silage and fish emulsion enhanced the nutrient content of hog manure. Fish emulsion helped to create a better balanced fertilizer at Jim Lamb's.

There is a cost to the low pH of fish silage. That cost is the cost to raise the pH of fish silage. If manure is used to correct the pH of fish silage, then the manure cannot be used to correct the pH of a soil and extra lime will have to be added to the soil to make up for this loss. Grinding fish without adding acid and adding the storage ground fish to the storage tank may be an answer to this problem. The fish emulsion stored at pH 5.9 and 42.6% dry matter kept in barrels for a week without any appreciable odour.

Organic fertilizer can be supplemented for inorganic fertilizer providing that it is cost competitive.

**ANNAPOLIS CO. SOIL & CROP IMPROVEMENT ASSOCIATION
PROTEIN CROP FUNGICIDE TRIAL**

**A.J. Wilson
Soil & Crop Specialist**

Co-operator: Leonard Pick

Objective: To compare varieties of soybean and fababeans and measure the effect on yield of fungicide applied to fababeans.

Fertilizer: Cattle manure

Procedure:

Twelve of the following treatments were replicated four times:

- 1) Aladin - 50/50 seed coat of Benomyl & Thiram
- 2) Outlook - 50/50 seed coat of Benomyl & Thiram
- 3) Ackerperle - control
- 4) Pegasus - 50/50 seed coat of Benomyl & Thiram
- 5) Kg20 - seed coat Anchor
- 6) Kg30 - seed coat Anchor
- 7) Encore - 50/50 seed coat of Benomyl & Thiram
- 8) Maple Amber - seed coat of Anchor
- 9) Maple Arrow - seed coat of Anchor
- 10) Ackerperle - 50/50 seed coat of Benomyl & Thiram
- 11) Ackerperle - 50/50 seed coat of Benomyl & Thiram
plus Mancozeb 200 at flowering
- 12) Ackerperle - 50/50 seed coat of Benomyl & Thiram
plus a spray of fixed copper at flowering

Soybeans

Kg 20 Maple Amber
Kg 30 Maple Arrow

Fababeans

Aladin Pegasus
Outlook Encore
Ackerperle

Results:

Table 1: Protein Crop Yield Data

<u>Cultivar</u>	<u>t/ha at 85% D.M.</u>
Kg 30	4.5
Aladin	3.9
Kg 20	3.8
Maple Amber	3.6
Ackerperle (control)	3.5
Outlook	3.5
Ackerperle Mancozeb 200	3.3
Maple Arrow	3.2
Ackerperle (seed coat)	3.2
Encore	2.9
Ackerperle Fixed Copper	2.4
Pegasus	1.7

LSD .05 = 0.36 t/ha

Discussion:

Top soybeans significantly out-performed fababeans at this site. Kg 30 was the top producing soybean while Aladin out-performed the other fababean varieties.

Seed treatment or fungicide did not add yield to fababeans. This was probably due to late planting and the lack of disease pressure.

**SOIL & CROP ASSOCIATION
PASTURE, HAYLAGE & CEREAL COMPETITION - WESTERN REGION**

**A.J. Wilson
Soils & Crops Specialist**

Objective: The objective of the Soil & Crop Associations participating in the Western Region Soil & Crop Competition is to promote quality forage and improved pasture management, haylage, hay and cereal production.

Results:

ANNAPOLIS CO. HAYLAGE COMPETITION

Grower	kg/ha	% P	% TDN	Replacement Value P & TDN \$/ha
Banksmere Farms	12,312	19	61	2,187
L. Pick	13,923	12	55	2,031
A. Phinney	13,569	11	58	1,990
Bill van Roestel	11,022	20	60	1,939
George Bent & Sons	10,126	20	63	1,834
Andrew Bishop	12,464	11	57	1,806
Gordon Jackson	10,651	14	59	1,718
Russell Ward	10,212	11	58	1,498

LUNENBURG CO. PASTURE COMPETITION

Grower	kg/ha	% P	% TDN	Replacement Value P & TDN \$/ha
P. Faulkenham	20,613	26	68	3,922
R. Veinot	18,643	20	64	3,356
L. Wile	18,627	19	63	3,385
A & G Hebb (A)	18,557	28	74	3,710
P. Wile (A)	17,919	25	72	3,499
M. Vissers (A)	17,826	20	75	3,590
H. Eagle (A)	14,780	25	74	2,959
V. Naugler	14,564	20	64	2,655
M. Meisner	14,057	25	68	2,668
W. Hebb (A)	13,475	24	76	2,744
B. Mailman	10,615	19	63	1,883
R. Delong	10,171	21	66	1,899
D. Joudrey	8,368	31	71	1,625
B. Crouse	7,971	23	68	1,508
A. Croft	6,850	23	73	1,363
T. Crouse	6,525	19	65	1,168

ANNAPOLIS CO. PASTURE COMPETITION

Grower	kg/ha	% P	% TDN	Replacement Value P & TDN \$/ha
B. vanRoestel	11,575	23	65	2,135
A. Bishop (A)	9,922	23	68	1,867
R. Chipman (M)	8,452	24	70	1,629
J. Lawrence (A)	8,407	28	71	1,608
K. Charleton (A)	8,236	19	68	1,521
E. Bishop	7,630	20	67	1,402
L. Hudson (A)	6,496	14	67	1,125
A. Phinney	5,995	20	70	1,146
L. Pick	5,687	20	68	1,040
B. Armstrong	5,159	21	76	941
R. Chipman (K)	4,584	19	56	769
L. Crawford	3,536	19	65	626

(A) - Annual Ryegrass; (M) - Mimer; (K) - Kenhy - remainder perennial

ANNAPOLIS CO. CEREAL COMPETITION

Grower	Cereal	Harvest Date	% H ₂ O	@ 14% H ₂ O (t/ha) ²
Leonard Pick	Barley	August 16	17.2	6.2
George Bent & Sons	Barley	August 10	14.0	5.3
Bill Armstrong	Barley	August 18	14.5	4.5
G. Jackson	Barley	August 16	17.0	4.4
L. Evans & Sons	Barley	August 17	17.3	3.8
D. Sproule	Wheat	August 18	14.4	3.6

Discussion

What we have seen over the years is that fertilization not only increases protein content, it also increases T.D.N.. Also, species selection and timing of harvest is having a dramatic affect on forage quality.

Kenhy takes a lot of fertility and frequent forced grazing to produce a quality forage, whereas a variety like Sonja or Ladino clover is always high in P and TDN.

**SUBSURFACE DRAINAGE PERFORMANCE ON A
SHALLOW SLOWLY PERMEABLE NOVA SCOTIA SOIL
ALFI PROJECT # TD12**

**Eric Bosveld
Soil and Crop Specialist**

The following is the 1989 cropping report of the ALFI technology development project (TD12) on tile drainage spacing. This project was initiated in 1987 to examine in detail the effect of tile drainage spacing of 100mm pipe on a Queen slowly permeable, basal till soil. A multi-disciplinary team headed by Dr. Ali Madani (N.S.A.C. Engineering Dept.) and consisting of members of the Soils and Crops Branch and Extension Engineering was formed to manage the evaluation of the project.

The following treatments were installed and replicated three times at Stan Moore's in Conn Mills, Cumberland Co.

A detailed soil survey was undertaken before the drainage was installed to establish a benchmark of the soil characteristics. Detailed analysis of soil properties will also be evaluated upon project completion to characterize the effects of the various spacings. Furthermore, outflow data, water table height measurements, soil moisture measurements and trafficability evaluations will also be documented in the final report and will be used to technically evaluate the various spacings.

In terms of crop response, the 1988 barley yields were inconclusive. In 1989 the yields of Max spring wheat were determined more precisely by harvesting three strips across the tile lines of each plot with the Hege plot combine to improve data accuracy. The wheat from all plots was of sufficient quality to make milling grade. A summary of the management practices used is included below.

Seeding Rate: 115 kg/ha
Seeding Date: May 22, 1989
Fertilizer: 400 kg/ha 17-17-17 worked in at seeding
Weed Control: MCPA @ 1.5 L/ha at ZGS 31

The yields and thousand kernel weights (TKW) were as follows:

<u>Treatment</u>	<u>Yield (kg/ha)</u>	<u>T.K.W. (g)</u>
1. 3 meter spacing	2681	29.3
2. 6 meter spacing	2552	27.3
3. 12 meter spacing	2578	29.2
	* N.S.	N.S.

* not significant at the 0.05 level of probability

There were no statistically significant differences in either yield or thousand kernel weights in 1989. However, it must be remembered that the crop was not seeded until May 22, which may have masked any differences. Had each treatment been seeded separately as soon as soil conditions permitted the probability of noticing yield differences between treatments would increase.

Spring cereals such as barley establish the number of potential heads per unit area and the number of kernels per head early in the growing season. Late seeded crops tend to rush through their growth stages which lowers the potential yield.

In all likelihood, by May 22nd, all drainage treatments lowered water tables sufficiently so that early and deep root development occurred. At the onset of the drought in July and August, kernel filling was obviously not significantly affected by the drainage treatments as indicated by the thousand kernel weights.

Next year an alfalfa/timothy mix will be seeded. Yields, quality and botanical separations will be utilized to evaluate the various spacings.

SMALL BORE, CLOSELY SPACED TILE DRAINAGE DEMONSTRATIONS

Eric Bosveld
Soil and Crop Specialist

Location: Lower South River, Antigonish Co., N. S.
Co-operator: John Van Zutphen
Design: Unreplicated field size plots
Soil Type: Queens Basal Till
Soil Analysis: O.M. pH P_{20_5} K_2O Ca Mg
5.5 6.4 267(H-) 322(H) 3552(M) 781(H)

Fertility: Light coat of manure (early spring)
395 kg/ha 5-20-20 for 1st cut
280 kg/ha 5-20-20 for 2nd cut
110 kg/ha 0-0-60 late summer

Over the last several years there has been substantial interest in the use of closely spaced, narrow bore pipe to drain compacted basal till soils. In 1983, a demonstration was set up at John Van Zutphen's farm in Antigonish County to examine the effectiveness of a narrow bore, closely spaced drainage system. Conventional drainage pipe (100mm) spaced 12 meters apart was compared with 35mm pipe at 3 meter spacings on plots of approximately 1000m² each.

In 1985, an alfalfa/timothy (65/35) mix was established. Yields of the forage in 1989 were determined using the square meter technique (5 measurements per plot) and fresh forage samples were taken for lab analysis. The first cut was taken on June 6th and the second on August 3rd with the following results:

	<u>Narrow bore, closely spaced</u>	<u>Conventional</u>
1st cut yield (kg D.M./ha)	3842	3856
2nd cut yield (kg D.M./ha)	2739	2735
Total	6581	6591
C.P. (1st cut)	13.9	13.5
C.P. (2nd cut)	17.4	17.0
T.D.N. (1st cut)	57.1	57.9
T.D.N. (2nd cut)	66.1	66.0

The yields and quality analysis were virtually identical for each drainage system, however some useful observations were made. In early June, approximately 10% of the ground area was alfalfa in all five samples taken in the narrow bore, closely spaced plot. Samples taken in the conventional plot had slightly less alfalfa, however, two samples were virtually devoid of alfalfa altogether. However, due to the small number of samples taken, this was not documented by substantial differences in crude protein.

By August, it was obvious that there was more alfalfa in the narrow bore, closely spaced plot and it was not nearly as patchy as in the conventional plot where it predominated primarily over the tile drains. Although there were slight differences in protein, this aspect is not obvious due to the methodology of data collection.

HORSCH SEEDER
ALFI PROJECT # TT-64

J.E. Peill
Lyndhurst Farms Ltd.

In the first Interim Report we relayed a number of different Horsch applications when used for crop establishment in the fall of 1988. The individual applications were numbered 1 to 11; the following refers to the same numbers.

1. Winter canola in bush-hogged land, not packed, winter wheat stubble all straw left on (upland).

Crop Ploughed down in spring due to winter-kill.

2. Winter canola in spring wheat stubble, unworked, all straw left on (dykeland).

60% of the crop was ploughed under in spring due to lack of winter survival. 40% were retained and gave a yield of 3 tonnes/ha.

3. Winter canola in spring barley stubble, unworked, all straw left on (dykeland).

All canola was winter-killed and ploughed up in the spring.

4. Winter wheat in Tibor oat stubble, direct seeded, all straw left on. The volunteer Tibor caused a lot of competition in the fall, but was subsequently sprayed out with Hoegrass. The wheat crop recovered and gave a yield of 4.8 tonnes/ha. If it hadn't been for the volunteer problem, we judge the yield would have been one tonne/ha higher.

5. Winter wheat in bush-hogged winter wheat stubble, all straw left on.

Uneven establishment in the fall, early disease infection in the fall; Yield only 2.2 tonnes/ha. Not an advisable practice.

6. Winter wheat after potatoes, chiseled and packed. Establishment somewhat uneven, but crop recovered and gave a yield of 5 tonnes/ha.

7. Winter wheat in settled conventional seedbed after summer fallow.

Quite uneven crop establishment due to variation in seeding depth. Yield: 4.8 tonnes/ha.

8. Winter wheat after freezer beans, bush-hogged and packed. Very uneven crop establishment due to uneven seeding depth. Yield: 4.5 tonnes/ha.

9. Winter wheat directly into soybean stubble, all soybean straw left on. Crop establishment was quite good; yield: 5.1 tonnes/ha. However, any depressions in the field such as tracks from previous tramlines, etc. were visible through the entire growing season.

10. Winter wheat in wheat stubble prepared with Horsch on dyke. Very nice crop establishment, but extreme disease pressure due to early contact with crop residue left on top of the field. Yield: 4.9 t/ha.
11. Winter wheat directly seeded after winter wheat without seed bar under very difficult conditions, following Roundup treatment of heavy grass infestation. The entire field of 5 ha. was lost due to winter-kill. Part of the loss could have been attributed to the fact that it is a very difficult piece of land to start with.
12. Spring 1989: Freezer peas planted in partially bush-hogged, partially ploughed land resulted in uneven germination; crop was by-passed by processor, hence no yield data.
13. Edible beans planted in well prepared, packed seedbed; gave good results as far as germination is concerned. The drawback of using the Horsch for crops such as peas and beans are the stones which it leaves on top, and which can be a problem during harvest time under stony conditions.

As reported already, where a crop was planted directly into the previous crop's stubble a machinery and labour saving of \$100 per ha. resulted. As can be seen from the above, however, the experienced yield depression far outweighed the savings in 1989.

As main reasons for the yield losses, we wish to report the following observations:

1. Uneven seeding depth means that some plants have to develop a long coleoptile to reach the surface. A number of these seedlings succumb along the way, while others emerge rather weak and sick, and are behind through the entire growing season. The timing of subsequent management operations, such as herbicide and fungicide or fertilizer applications is always a compromise because the growth stage spread within the crop is several stages apart.
2. There was a marked increase in stem, foliar and head diseases where the emerging plants would physically touch any crop residue from the previous year. This was particularly true where wheat followed wheat which was primarily done for purposes of this test, but is normally shunned by us as a standard practice.
3. The planting conditions in 1988 were, for the most part, rather wet; the Horsch enabled us to travel where other equipment operations were no longer possible. Thus, a number of fields were planted under less than ideal conditions. In retrospect, it would have been cheaper not to plant the field at all under such conditions.
4. Much the same arguments as cited above apply to our experience with peas, planted in the spring of 1989. Again, the emergence was rather uneven, which made it impossible to manage the crop, and very difficult for the processor to determine optimum harvest date, which we believe is one of the reasons why he chose to abandon this field.

Technically the machine worked well, with the exception of the beater bar, which would clog under extremely trashy conditions when the land and trash was wet. We experimented with different rotor speeds after this year's observations. It is my opinion that the rotor should be slowed down to avoid unnecessary soil beating. That is to say, the rotor speed should be the minimum required relative to forward speed to work the soil no more than absolutely necessary. It is expected that this optimum rotor r.p.m. will vary with soil type, moisture and trash conditions.

While the seeding depth, as reported, left much to be desired, the broadcast feature worked well, and gave as good a seed distribution as can be expected.

We learned that the Horsch will only give proper seeding depth in an absolutely even and firm seedbed. As described in our initial application, this is achieved by means of a 3-wheeled terra tire equipped tractor which covers the entire seeder width. With such an approach all the soil seeded would be evenly compacted. Until such a machine is used to pull the Horsch, its application will be limited to very well settled fields which are dry enough that the wheel tracks of the tractor do not make an impression any deeper than 1/2 to 1".

While ideal from a soil preservation standpoint, any trash left on top, especially where wheat follows wheat or barley after barley or either crop follows the other, is an immediate source of infection. Unless effective herbicides are available, we do not believe that such rotations will ever be practical.

We believe that the establishment of cereal after legume, providing the land is not worked and weed-free and dry, is a possibility. The establishment of spring crops after soybeans, providing the land is weed-free and dry, is another possibility.

It is our intention to test these combinations on a very limited basis next year. Large scale seeding of either spring or winter crop is not envisaged until we have found a viable solution to the problems mentioned.

We believe the only way to utilize the Horsch to advantage under Maritime conditions is a tractor with tires wide enough to cover the entire area seeded in one pass by the machine. Only under these conditions do we believe that even depth placement can be achieved under many different soil conditions, even freshly ploughed land.

We make this statement after having experienced that a front-mounted packer, which was acquired under this program in the spring of 1989, while improving the evenness of seeding depth somewhat, was not sufficient to resolve the problem.

**CROP TILTER
ALFI PROJECT # TT130**

**J.E. Peill
Lyndhurst Farms Ltd.**

A crop tilter, made by Lurmark in Britain, as described in detail in the project application, was purchased and installed on a Hardi 18-meter ICM special field sprayer.

The installation was carried out by Lyndhurst staff, and was completed without any problems. Technically, a crop tilter kit could be fitted to any conventional field boom sprayer.

The crop tilter was tested over a 2-week period, commencing on May 25, 1989. During this period the tilter was used on 120 ha. of winter wheat, at Zadok growth stage 37 to 45.

The crop tilter performed as expected; it opened the crop canopy for better droplet penetration, and contributed to drift reduction. However, two major technical problems arose, which prevented the use of the crop tilter for the remainder of the season.

The force exerted by the crop on the boom was greater than the structural boom members could withstand. Material fatigue rapidly became evident; attempts to strengthen the boom at the most critical spots did not prove practical. In our opinion, the only solution would be an entirely new boom assembly designed and built for use in combination with a crop tilter.

The second problem arose from a general weakness of the Hardi boom suspension system which proved inadequate when operating the crop tilter in the canopy. The forces exerted by the crop were so great, that the operator could not compensate for pitch and jar which would prevent nozzles from contacting the crop canopy. This resulted in leaf scorch, which became evident 5 to 7 days after the application.

After this experience the crop tilter was no longer used during the 1989 season.

In subsequent search of British literature, and communicating with the manufacturer, we learned that these limitations can be overcome by better boom suspensions and a stronger boom, as well as sprung axles on new sprayer models.

To modify the presently existing Hardi ICM special for reliable crop tilter operation would thus mean the importation of an entirely new boom assembly built for that purpose. We are presently investigating alternatives.

**LELY MECHANICAL WEEDER
ALFI PROJECT # TT135**

**Eric Bosveld, Soil and Crop Specialist
Werner Van Thielen, Co-operating Farmer**

The following is a summary of the interim report of an ALFI technology transfer project (TT135). The Lely Mechanical Weeder is a 4.5 meter wide, 3-point hitch mounted implement that can be used for mechanical weed control in several crops including cereals. It can also be used for incorporating seed, spreading manure paddies in pastures, and for breaking up crusted soil. One hundred and fourteen, 7mm spring steel tines in three rows can be adjusted to five different spring tensions.

The co-operator received the Weeder in good condition. Unfortunately it was a bit late for the seeding of small grains by the time it arrived and was assembled, which created difficulty in its complete evaluation. However, barley was seeded early in June and seven days later, half the field was blindharrowed. The primary purpose of blindharrowing is to control the very early germinating weeds and to stimulate even germination of those remaining so that when mechanical weeding takes place more complete control can be obtained. Due to wet conditions during the blindharrowing operation, substantial damage to the barley occurred. At this time the coleoptile of the new seedlings were near or at the surface of the soil. The weeder tended to pull the clods along the soil instead of moving effectively through it. It is hypothesized that if the soil had been a lighter texture, the damage would not have been as severe. However, it became very clear that drier conditions were needed for the use of the weeder. The observation was made that the principle weeds (buckwheat and hempnettle) were smaller on the blindharrowed portion of the field. On June 30, 1989, the barley was at approximately the 5 leaf stage (ZGS 15) and it was felt that the soil conditions were still too wet for the weeder. Unfortunately the conditions persisted and the weeding was not accomplished, necessitating the plowing down of the crop. It was noted that the blindharrowing with the weeder resulted in less damage when it was operated in the direction of the drilled rows as opposed to across them.

The Lely weeder was very effective in incorporating the seed for the subsequent winter wheat seeding. After the last pass with the spring tooth harrow, one pass of the Lely weeder was used for seedbed preparation. The seed was then broadcast onto the surface and incorporated with the weeder. This resulted in excellent seed coverage and when assessed for depth control, the vast majority of the seed had been placed within the top 0.5 inch of the soil surface. There was no need to use it for weed control since the weed population was low.

Pastures

The Lely weeder was very effective in redistributing manure paddies in the co-operator's pastures and subsequently was used on 10 of 11 paddocks. The check paddock (untreated) had uneven growth and those in which the weeder was used appeared as if they had had manure applied since growth was dark green and vigorous. The large number of tines scarifying and spreading the paddies and subsequently the incorporation of oxygen allowed for the rapid breakdown of the material. However, it did not appear to appreciably increase the number of days grazing per paddock. It was noted that when the grass was wet, unacceptable entanglement in the tines occurred.

A.L.F.I. EVALUATION OF A "GRIP TRACS" FOR A GRAIN & CORN COMBINE

Mannie Lewis, Steve Saunders, Kees Langelaan - Co-operators
Jack van Roestel, Crops Extension Specialist

During the late fall cereal harvest period in Nova Scotia, field conditions can often be very wet and thus cause significant crop losses, serious soil compaction/rutting, or inhibit harvesting entirely. To ensure against these harvesting delays, and soil damage the Aylesford Machinery Co-op (comprised of above mentioned farmers) last fall, purchased a versatile track kit that would fit a wide range of combines or forage harvesters. The introduction of these "grip tracs" to this province and subsequent evaluation, was partially funded by the A.L.F.I. Tech. Transfer program.

The "Grip Tracs" pictured below, replace the front tires of the combine, giving the machine more flotation, and better traction on wetter soils. The back side of the "Grip trac" drive sprocket is machined out to fit over the axle of the final drive. The double set of mounting holes and adaptor ring assures versatility on many machines.

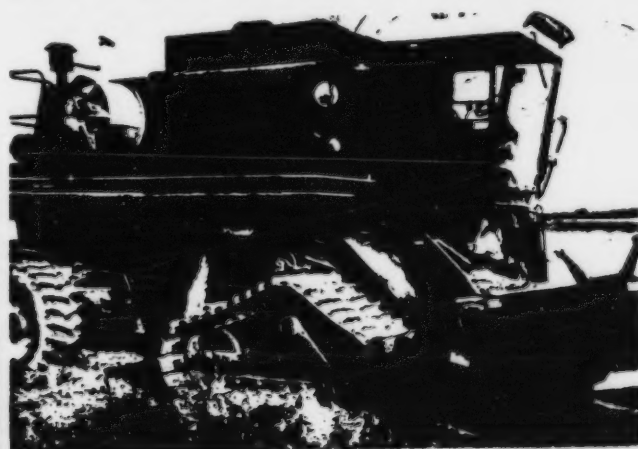
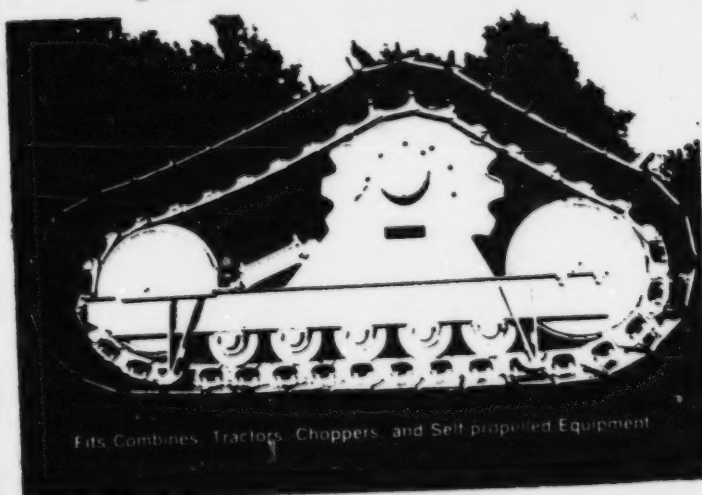
Suppliers literature on the Grip Trac indicate that these:

- harvest your crops in wet fields
- does not tear up fields
- less compaction with machine only 5 p.s.i.
- practically maintenance free
- no feeder house extension needed
- save 20% on your fuel costs
- steel pads never wear out

Evaluation of these "Grip Tracs" by the Aylesford Machinery Co-op was not possible in 1989 because the tracks arrived after grain harvest season and in the middle of corn combining. Also, the "Co-op's" transport trailer necessary to move a tracked combine from farm to farm (eliminating the major effort of switching from tracks-tires-tracks each time) was still under construction at this time.

In 1990, however, a detailed evaluation of the track's performance will be conducted. Next fall's evaluation report will include comparison between the combine operating conventionally vs. with the grip tracs, (i.e. harvest speed, combine performance, fuel consumption, soil compaction measurements). Also details on acreage of trac use, operator-customer comments, photos of combine operation will be submitted.

Diagram 1 & 2: AYLESFORD MACHINERY CO-OP'S COMBINE TRACKS



A.L.F.I. EVALUATION OF A GRAIN STRIPPING HEAD ON A CONVENTIONAL COMBINE

John and David Fuller, Co-operating Farmers
Jack van Roestel, Crops Extension Specialist

This most recent A.L.F.I. project will conduct a performance comparison of the newly developed grain stripping head versus the conventional pick-up reel header on a conventional combine.

The "Grain Stripper" manufactured in Suffolk Co., England has only been used on a commercial field scale since 1988 in the U.K., but has had pretty good performance reviews. The Fullers are in the process of purchasing this header and having it introduced to Canada for the first time.

The grain stripping head is claimed to greatly increase harvest speed by reducing the straw intake by up to 80%. The octagonal steel rotor has mounted on it 8 rows of plastic stripping fingers profiled as shown in Figure 1. These fingers are manufactured in lengths of 60 cm. which make it easy to change a section should one become damaged. The expected life of these fingers is around 300 ha.

Other features of the grain stripper are:

- adjustable crop deflector to suit varying crop heights
- 8-row plastic tooth, stripping rotor with variable speed adjustments (300-1,000 r.p.m.'s)
- adjustable skids for all conditions
- self-tensioning, endless plastic conveyor belt to main auger
- torque limiter, overrun clutch, crop dividers, and "lifting eyes"

Some criticisms of the stripper head is that it may lead to straw harvesting and disposal problems, higher grain losses in lodged crops, and high tooth breakage costs in uneven and stoney field situations.

The project will be conducted over the next two years with tours or individual farmers invited to view the grain stripping head unit in operation.

The evaluation will include comparison between the combine operating with a conventional grain head vs. the stripper, in side by side comparisons in different crop conditions. Details on combine harvest speed, head and rear-end combine losses, grain moisture in field and combine bin, cleanliness of grain (sample grade), operator comments, and photos of head/combine in operation will be submitted.

Figure 1: MANUFACTURER'S DIAGRAM OF GRAIN STRIPPER HEAD

